CONCENTRATION OF MERCURY IN SEDIMENTS AND FISH IN THE ST. LAWRENCE RIVER 1975

Ministry of the Environment
Ontario

The Honourable
Harry C. Parrott, D.D.S.,
Minister

Graham W. Scott,
Deputy Minister

CONCENTRATIONS OF MERCURY IN SEDIMENTS AND FISH IN THE ST. LAWRENCE RIVER

1975

SECOND EDITION

ONTARIO MINISTRY OF THE ENVIRONMENT

SOUTHEASTERN REGION

1979

CONTENTS

SUMMARY AND CONCLUSIONS

Data are presented for mercury concentrations determined in 926 fish samples collected in 1975 and 193 sediment samples collected in 1970 and 1975 at sampling locations throughout a 52 mile section of the St. Lawrence River between Iroquois and Bainsville Bay. Results are evaluated in terms of the extent of the river affected by mercury contamination from major sources in the City of Cornwall, trends that have materialized since 1970 when a significant reduction in mercury loadings was effected and the significance of current mercury loadings in relation to prevailing levels of mercury in fish. The following conclusions were derived:

1. Elevated levels of mercury in sediments extending along the north shore of the river for a distance of at least 12.4 miles downstream are attributable to mercury discharges from CIL and Domtar Fine Papers Limited via the Fly Creek sewer and perhaps other sources at Cornwall prior to 1970.

2. Reduction in mercury loadings in 1970 has lead to a noticeable decline in sediment mercury levels in the near-shore zone between 9 and 13 miles downstream of Cornwall. In 1975, contaminated sediments persisted in the near-shore region for a distance of approximately

7 to 9 miles downstream of Cornwall at levels similar to those of 1970. Processes of chemical desorption and food chain transfer are probably dominant factors in comparison to sediment transport in translocating sediment bound mercury downstream.

3. Average mercury concentrations are greater than 0.5 ppm in walleye, northern pike, and probably largemouth and smallmouth bass and are less than 0.5 ppm in yellow perch, pumpkinseed, bullhead, crappie, rock bass and white perch for the populations sampled.

4. Common size classes of pumpkinseed, black crappie, bullhead, yellow perch (up to 10 to 12 inches), bass (up to 14 inches), and pike (up to 18 inches) on average contain less than 0.5 ppm mercury and are acceptable for consumption on a regular basis. Larger yellow perch, pike and bass contain somewhat higher levels but are suitable for restricted consumption based on recently established Ontario guidelines. Only walleye greater than 18 inches are totally unacceptable for consumption.

5. Mercury concentrations in fish populations downstream of Cornwall are not significantly elevated relative to upstream populations considering species for which comparative data are available. Accordingly mercury levels in fish are not significantly affected by current mercury loadings from sources at Cornwall.

6. Based on general comparisons with data available for 1970, it is likely that mercury concentrations have declined significantly in walleye, northern pike, bass and yellow perch and other species up to 1975. Additional sampling will be required to assess future trends.

INTRODUCTION

The potential significance of mercury pollution and the major sources of environmental contamination in Ontario were recognized as early as 1969. [1] Mercury usage in "chlor-alkali" plants in the production of chlorine and caustic soda and to a lesser extent the use of mercurial compounds as slimicides in the pulp and paper industry have been identified as the major artificial sources. Since 1970, discharges from these two sources to watercourses of the Province have been largely curtailed and related levels of environmental contamination, particularly in fish, have been documented. [2, 3, 4, 5].

Elevated levels of mercury in fish flesh exceeding the acceptable limit (for regular consumption) of 0.5 parts per million (ppm)* were found in 1969 in most commercial and sport fish species in waters receiving major point source discharges. Accordingly restrictions on commercial fishing were instituted and anglers were advised not to consume contaminated species.

Before 1970, significant inputs of mercury to the St. Lawrence River originated from several sources at the City of Cornwall, the principal source being the chloro-alkali plant of Canadian Industries Limited (CIL). Total inputs from these sources have since been substantially reduced.

* ppm = mg/kg

The commercial fishery downstream of the City of Cornwall was closed in May, 1970 based on 1969 findings of elevated levels of mercury in most commercial species. In addition, preliminary results at that time indicated relatively high levels of mercury in fish populations from the upper St. Lawrence River (upstream of Moses-Saunders dam) which was subsequently confirmed by further analysis undertaken by the Ontario Water Resources Commission (now within the Ontario Ministry of the Environment). (6) The ban on commercial fishing was extended to include all of the St. Lawrence River and most of the eastern basin of Lake Ontario. Restrictions were later removed for certain species. At the present time, the commercial fishery remains closed downstream of Cornwall for all species with the exception of catfish and brown bullhead while sunfish and crappie can be fished under special permit. Upstream of Cornwall, to Prince Edward County, restrictions currently apply only to American eel, walleye and northern pike.

Mercury contamination has had little apparent effect on the magnitude of the sport fisheries of the St. Lawrence River. In Lake St. Francis, populations of yellow perch and northern pike have increased in recent years and account for the majority of the fish taken. Yellow perch are offered extensively for sale in local restaurants and retail outlets. Also, a wide variety of fish species are utilized by Indians of the St. Regis reserve who have traditionally fished waters in the vicinity of Cornwall Island and St. Regis Island downstream of Cornwall.

In 1975, a review of available data indicated a need for expanding and updating the information on the levels of mercury in major commercial and sport fish species. In co-operation with staff of the Cornwall District of the Ministry of Natural Resources, a fish sampling and analysis program was initiated in October, 1975. This report presents the results of this program and data on mercury concentrations in river sediments in the Cornwall area obtained in other surveys undertaken in 1975 and 1970. Results are evaluated in terms of the extent of mercury contamination, significance of present sources at Cornwall, acceptability of fish for consumption and trends that might have materialized since 1970 when mercury discharges were reduced.

MERCURY SOURCES

Effluents from CIL, Domtar Fine Papers Limited and the sewage treatment plant at Cornwall have been identified as sources of mercury contamination. Effluents from CIL and the Domtar mill are discharged collectively to the St. Lawrence River through the Fly Creek sewer located approximately 1,000 feet* upstream of the International Bridge. An extended outfall (300 feet) and diffuser were constructed in 1972 by Domtar. Sewage and other industrial effluents at Cornwall were discharged at a number of locations before 1970 but have since been directed to a primary treatment plant and discharged offshore through an extended outfall located near the easterly limits of the city. The relative significance of these sources, past and present, as well as other possible sources of mercury are described briefly in the following sections.

* 1 ft. = 0.305 metres

CIL

CIL began production of chlorine and caustic in 1935 utilizing the mercury cell process and has expanded in production capacity from 36 tonnes of chlorine per day originally to presently 145 tonnes per day. In 1970 and prior, mercury losses via CIL effluent discharged to the St. Lawrence River were estimated to be in the order of approximately 590 kilograms annually. Implementation of treatment of highly contaminated waste streams instituted by the company following a directive issued by the OWRC in March, 1970 has resulted in a substantial reduction in effluent mercury losses. Annual loadings in the interval to 1975 have been estimated to be in the order of 55 kilograms representing a reduction in excess of 90% and loadings well below the limit of 114 kilograms per year based on a standard of 0.0025 kilograms kilograms per tonne of chlorine produced per day established by federal regulations applying to chlor-alkali plants. Over a 35 month period, 1972 - 1975, effluent data indicated compliance with the federal discharge regulations 97.5% of the time. Further details pertaining to production processes, effluent sources and mercury treatment facilities and monitoring at the CIL plant have been described elsewhere. (7)

In addition to effluent mercury losses directly to the river from the CIL plant, airborne emissions of mercury, estimated to be approximately 23 to 32 kilograms per month in 1976, may represent a secondary source to the river

via fallout and precipitation. In 1978, these emmissions were reduced to comply with Federal regulations and are about 20 kilograms per month. A recent study [7] has shown decreasing mercury concentrations in vegetation and surface soil samples from the site of the CIL plant extending in a northeasterly direction as influenced by prevailing southwesterly winds. Under conditions of westerly and northwesterly winds, airborne emissions would intersect the river. Although studies have not been undertaken to estimated mercury fallout rates, it is likely that airborne emissions represent an additional but relatively minor source to the river.

DOMTAR

Although various mercurial compounds were in general use until 1970 to control bacterial "slime" growths associated with pulp and paper production at Ontario mills, the Domtar mill at Cornwall terminated the use of phenylmercuric acetate for this purpose in 1964 with a total of 50 pounds being used in that year. A portion of this mercury was incorporated in the paper and the remainder, an unknown quantity, was discharged to the river. In addition, mercury was used until 1970 to achieve mould-inhibiting properties in paper, a use which did not result in mercury losses to the river. Thus inputs to the river from this source dated to 1964. The actual loading rates cannot be determined but would have been considerably less than the earlier loadings from CIL and possibly comparable to the total from other sources at Cornwall.

CORNWALL SEWAGE TREATMENT PLANT

Sewage treatment plant effluents which often include effluents from local industries, generally contain somewhat elevated concentrations of mercury ranging up to 1.0 part per billion (ppb)*. Collectively sewage treatment plant effluents from Canadian and American communities along the St. Lawrence River may represent a diffuse but important source of mercury contamination. At Cornwall, sewage and effluents from several industries receive primary treatment and are discharged to the St. Lawrence River through an extended outfall terminating 900 feet off-shore in the main flow of the Cornwall Channel. Although only limited data are available, estimated mercury loadings based on average flows and an average of 0.65 ppb mercury in the final effluent, are in the order of 9 to 11 kilograms annually. (7) A small percentage of mercury may be removed in primary treatment and before treatment was effected in 1970, loadings from this source might have been somewhat higher.

CORNWALL LANDFILL SITE

A variety of industrial wastes are disposed of at this site. Until late 1976, these included retorted sludges from the CIL plant containing significant levels of mercury. Analysis from five water sampling wells located around the landfill site in 1976 showed mercury concentrations in groundwater

* ppb = ug/kg

to be well above background levels. (7) Results ranged from 0.7 ppb to 7.8 ppb as compared with a range of 0.01 to 0.1 ppb typical of natural waters. These results show that mercury is leaving the landfill site and would ultimately be transported via surface runoff to the St. Lawrence River. However, in terms of potential effects on the St. Lawrence River, loadings from this source would be relatively minor considering the reported concentrations and the relatively small drainage area involved.

SAMPLE COLLECTION

SEDIMENTS

Sediment mercury data presented in this report were derived from analysis of sediment samples collected in the course of various surveys carried out in 1970 and 1975.

Between August 17 and September 25, 1970, 38 samples were collected at sites extending from the Moses Saunders Dam (approximately 3 miles* upstream of the Fly Creek sewer) through the Cornwall Channel and downstream to the vicinity of Thompson Island (approximately 13 miles downstream of the Fly Creek sewer). In another survey of June 30, 1970, samples were collected at five sites, each located 200 feet from shore at distances ranging from 1800 feet to 4750 feet below the Fly Creek sewer and at 6 sites on a transect (approximately 5.4 miles downstream) extending from Graveyard Point (Glen Walter) to St. Regis Island.

Sediment samples were collected in 1975 in conjunction with a water quality survey of the St. Lawrence River at Cornwall, a project sponsored under the "Experience '75" program and carried out by students of the Cornwall Campus of St. Lawrence College with direction being provided by college and MOE staff. Between July 28 and August 14, 97 sites were sampled on 41 transects between the Moses Saunders Dam and Stonehouse Point.(8) Sampling site locations and general coverage of

* 1 mile = 1.6 kilometres

this section of the river approximated that of the 1970 survey. Additional sediment sampling in 1975 was undertaken by staff of the Water Resources Branch, MOE at 18 sites upstream of the Moses Saunders Dam to expand data on background levels and at 29 sites downstream of the Cornwall Channel and extending into Lake St. Francis to duplicate sampling undertaken in 1970.

Sampling methodology varied somewhat between the various surveys but in general comparable samples were taken. Most samples were collected using a ponar dredge and consisted of surface sediment material to a depth of 2 to 3 inches* in the case of the 1970 samples and 2 to 3 centimeters for the 1975 samples taken from one grab sample at each sampling site. Samples were frozen and stored for analysis with the exception of the August - September, 1970 samples which were air-dried and held in storage until 1975.

FISH

Fish samples were obtained during the period of October 27 - 30, 1975 by commercial fishermen contracted by the Cornwall District of the Ontario Ministry of Natural Resources (MNR). A total of 891 fish specimens comprising 10 species were collected in trap nets at five sampling sites as described in the following table:

* 1 inch = 2.54 centimetres

Station	Vicinity	Co-Ordinates
A	Bainsville	lat 45 10 30 long 74 23 10
B	Charlottenburgh	lat 45 05 36 long 74 30 26
C	Summerstown	lat 45 02 50 long 74 34 20
D	Glen Walter	lat 45 01 52 long 74 37 48
E	Iroquois	lat 44 51 10 long 75 17 10

The above sites extended over a 52 miles reach of the river from Iroquois approximately 30 miles upstream of Cornwall at the head of Lake St. Lawrence to Bainsville, approximately 22 miles downstream of Cornwall in Lake St. Francis. Station D was located closest to the Fly Creek sewer at a distance of 6 miles downstream. At the four downstream stations (A - D) samples consisted of yellow perch, pumpkinseed, largemouth bass, smallmouth bass, northern pike, brown bullhead and black crappie. At the upstream site (E) white sucker, rock bass, and white perch were taken in addition to the above species. Sample size for each species at each location was generally adequate to assess prevailing levels of mercury. Exceptions to this were; a) Summerstown (Station C) where a sufficient sample was obtained only for yellow perch and bullhead; and b) largemouth bass and smallmouth bass which were poorly represented in all samples.

An additional sample, including 19 walleye and 15 white sucker, was taken from the Raisin River spawning run in April, 1976. These fish can be assumed to be indigenous to the waters of the north shore downstream of Cornwall and were taken to augment the sampling of October, 1975 which did not include these species. All fish received at the MNR, Cornwall office were frozen and later delivered to MOE, Kingston Office for processing.

Samples of dorsal fillets (whole fillets for fish weighing less than 300 grams) were taken from each fish, packaged in foil and refrozen. Total length and weight was recorded for each specimen. Scale samples were taken (with the exception of bullheads) for age analysis by MNR, Eastern Region.

ANALYSIS

Fish and sediment samples were submitted to the MOE laboratory for mercury analysis. All analyses were based on the flameless atomic absorption procedure. Details of sample preparation and analytical methods used in the MOE laboratory since 1970 have been described elsewhere.(5)

MERCURY IN SEDIMENTS

Analytical results for sediment samples collected in 1970 and 1975 are presented in Appendix C, Table C-1 and C-2, respectively.

These data are summarized and discussed in the following two sections in terms of the extent of mercury contamination from sources at Cornwall as revealed by elevated levels in sediment and a comparison of the levels prevailing in 1970 and 1975.

DISTRIBUTION

The more extenstive data base of 1975 has been used to map the distribution of mercury concentrations in surface sediments of the river in the vicinity of Cornwall as presented in Figure 1. The distribution of mercury contaminated sediments can be determined through a comparison with the "natural" or background levels typical of uncontaminated portions of the river. Sediment mercury concentrations in the St. Lawrence River upstream of Cornwall have been determined from data obtained at control stations in this study, analysis of samples collected in the course of other surveys undertaken in 1967 and 1970 (unpublished) and 1968 data for the Eastern Basin of Lake Ontario reported by Thomas.[9] In general, background levels are typically in the range of 0.01 - 0.9

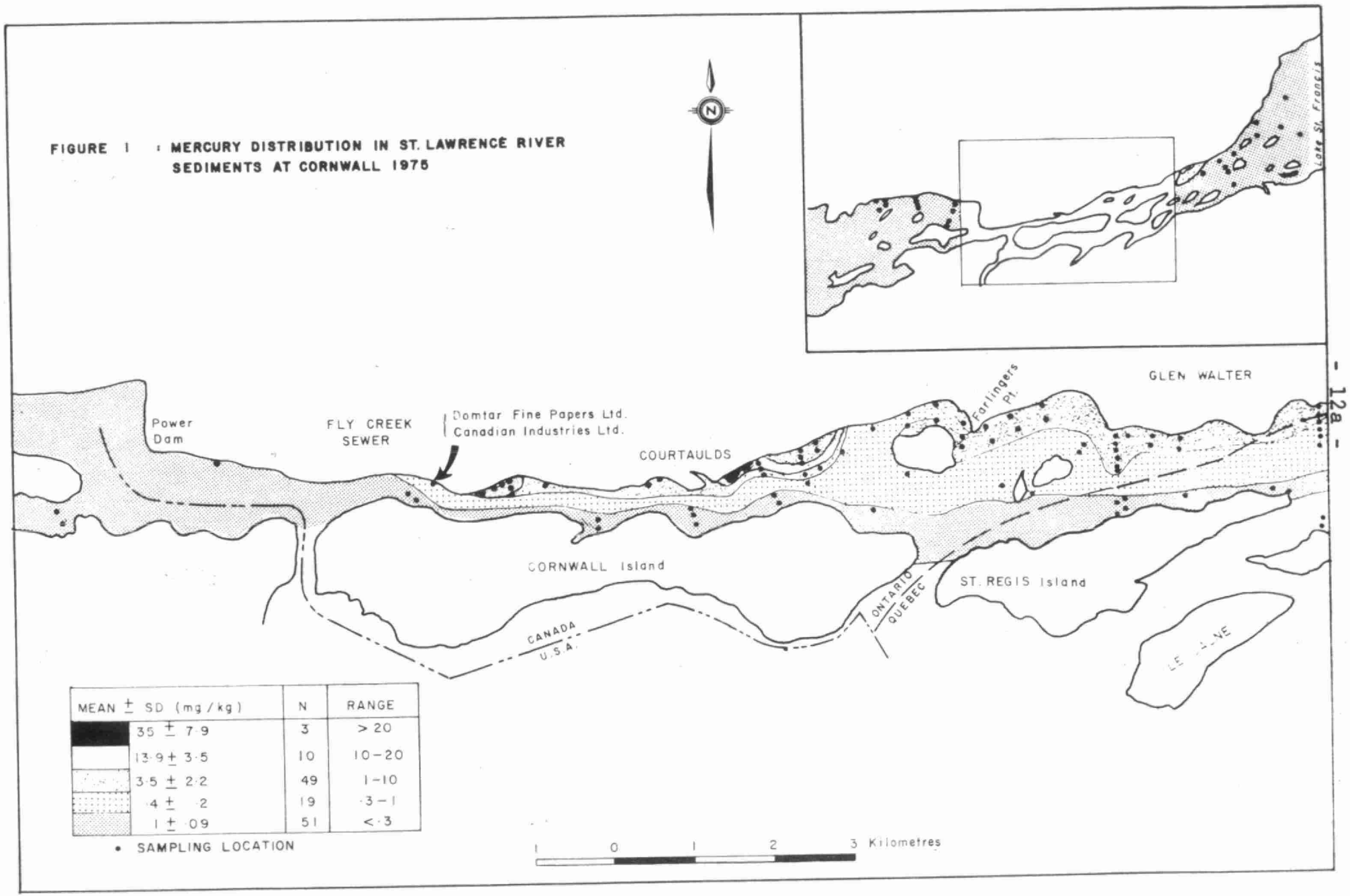


FIGURE 1 : MERCURY DISTRIBUTION IN ST. LAWRENCE RIVER SEDIMENTS AT CORNWALL 1975
N
Lake St. Francis
Power Dam
FLY CREEK SEWER
Domtar Fine Papers Ltd.
Canadian Industries Ltd.
COURTAULDS
Farlingers Pt.
GLEN WALTER
CORNWALL Island
CANADA
U.S.A.
ONTARIO
QUEBEC
ST. REGIS Island
MEAN ± SD (mg/kg)
N
RANGE
35 ± 7·9
3
> 20
13·9 ± 3·5
10
10–20
3·5 ± 2·2
49
1–10
·4 ± 2
19
·3–1
1 ± ·09
51
<·3
• SAMPLING LOCATION
0 1 2 3 Kilometres

ppm (mg/kg) depending on sediment composition. Levels ranging up to 0.1 ppm are characteristic of coarser, predominantly inorganic sediments (less than 10% ignition loss) whereas levels are usually in the range of 0.1 - 0.9 ppm for sediments with a higher organic and/or silt-clay content. Similar values in relation to sediment composition have been reported for other non-contaminated waters.[2, 3, 10]

With reference to Figure 1, mercury concentrations are considerably elevated above background along the north shore commencing at the Fly Creek sewer and extending downstream beyond a distance of approximately 7 miles. Higher concentrations, up to 44 ppm, are evident in two zones along the Cornwall waterfront commencing at distances of 0.6 miles and 2.3 miles downstream of the Fly Creek sewer. Waste effluents from Courtaulds (Canada) Limited are discharged to the river in the latter zone and high mercury concentrations in sediments proximal to these effluents has raised the implication of an additional source of mercury in this area. However, recent investigations have shown that Courtaulds effluent mercury loadings are negligible although previous use of unfiltered caustic may have resulted in somewhat higher loadings that could account to some extent for the higher sediment concentrations noted in this area.[10] A more probable explanation is that these represent the first zones downstream of the Fly Creek sewer where there is an appreciable decline in river flow and increase in deposition of finer sediments

consisting of silty clay with relatively high organic content. Thus, it is likely the proximity to the major input source plus the relatively high chemical sorption capacity of sediments that account for the higher levels observed.

In examining the distribution of mercury contaminated sediments, two trends are evident. Firstly, with few exceptions, concentrations are highest at sites nearest the north shore and decrease progressively with increasing distance offshore. This concentration gradient, as would be expected, is governed largely by flow patterns and the composition of sediments which consist of finer materials in near-shore backwater areas and coarser sands further offshore under the influence of greater flow rates. At all ranges sediment concentrations above background levels are confined to waters between the north shore and the Seaway navigational channel. Comparable sediments south of the shipping channels and along the north shore of Cornwall Island and St. Regis Island contain levels within the range of background for the river. Secondly, concentrations in general decrease progressively at successive downstream ranges. For example, near-shore sediments at ranges approximately 5.5, 7.1 and 9.6 miles downstream of the Fly Creek sewer contain 5.9, 4.7 and 0.1 ppm mercury, respectively. Data for 1970 indicate similar trends in the distribution of mercury in sediments below Cornwall with the exception that the zone of contamination

extended further downstream. Concentrations of 3.4 and 2.7 ppm were measured in 1970 samples taken approximately 9.6 and 12.4 miles downstream respectively as compared with background levels measured in 1975 samples from these locations.

Based on the data for both 1970 and 1975 samples, it is evident that mercury inputs in effluents discharged via the Fly Creek sewer have resulted in the contamination of river sediments in an area confined to the north shore and extending downstream a distance of at least 12.4 miles. It can be assumed that the downstream translocation of mercury from Cornwall sources and subsequent uptake by fish either directly or through the food chain has occurred only within this zone of the river.

COMPARISON OF 1970 AND 1975 RESULTS

Mercury concentrations determined for sediments from selected stations sampled in 1970 and 1975 are compared in Table 1. Although the 1970 sampling sites were not duplicated exactly in 1975 the two sets of data are considered to be comparable for purposes of this analysis. While results are somewhat variable, data for the two years show a similar pattern in terms of the distribution of elevated mercury levels and trends toward decreasing levels at successive downstream and offshore sites. Values given for sites upstream of Cornwall

TABLE 1: COMPARISON OF MERCURY CONCENTRATIONS IN SEDIMENTS AT SELECTED SITES IN THE ST. LAWRENCE RIVER BETWEEN 1970 AND 1975.

Distance from Fly Creek (mi.)[1]	Distance off north shore (ft.)[2]	Mercury (ppm dry wt.)[3] 1970	1975
3.1 (upstream)	9000	0.29	0.09
	9800	0.06	0.02
2.6	25		9.60
	100		5.30
	150	7.68	
	450		1.50
	500	3.51	
5.5	160	4.00	5.87
	410		3.65
	820		0.91
	1070	0.65	2.02
	1400		2.14
	1800		0.02
	2130		0.22
	2790		0.20
	3120	0.70	0.20
	3200	0.35	
	3300	0.30	
	3350	0.07	
9.6	1400	3.37	0.10
	1900	1.24	0.10
	4800	0.64	0.64
	6100	0.24	0.01
	8700	0.31	0.01
12.4	2700	2.73	0.24
12.9	7400	0.64	0.04
13.3	11600	0.09	0.01

1 1 mi. = 1.6 km

2 1 ft. = 0.305 m

3 ppm = mg/kg

and within a distance of 5.5 miles downstream of the Fly Creek sewer show no apparent change and are for the most part within the same order of magnitude for the two years. The same is evident from results for all stations up to approximately 7 miles downstream. On the other hand at stations between 9 and 13 miles downstream, it is evident that there has been a marked decrease in mercury levels at least for near-shore sites in the five year interval.

Various studies have shown that inorganic and organic mercurial compounds are rapidly incorporated into the sediments but to a degree are transitory and subsequent translocation downstream is effected by several mechanisms including physical resuspension, bed load transport and chemical desorption.[11, 12] For instance clearance of mercury accumulations in St. Clair River and Lake St. Clair sediments that originated from point source inputs up to 1970 has occurred over a relatively short period of time and is considered to be one factor responsible for the noticeable decline in mercury concentrations in fish.[5] In the St. Lawrence River below Cornwall, survey results have shown that the major accumulation of mercury in sediments has been confined to zones of net sediment deposition where sediments are relatively stable due to minimal water exchange, negligible agitation from wave action and the prevalence of rooted vascular vegetation. Therefore a rapid elimination of

mercury loads in sediments by processess of sediment transport would not be expected and it is likely that methylation, chemical desorption and transfer through the food chain are collectively the dominant processes operative in elimination of mercury from sediments. The similarity between sediment mercury levels measured in 1970 and 1975 samples in the contaminated zone extending approximately 7 miles below Cornwall would suggest that inputs of mercury in recent years roughly approximate that released from the sediment resulting in no significant net change. Further downstream from approximately 9 to 13 miles below Cornwall, concentrations have apparently decreased to backgound levels in the five-year interval since 1970 indicating that the effects of reduced loading rates in recent years do not extend downstream beyond approximately 7 to 9 miles.

MERCURY IN FISH

RESULTS

Results of individual mercury analysis for 926 fish specimens included in this study are tabulated in Appendix C, Tables C-3 to C-8 by sampling location. In Appendix B, Table B-1 to B-5 and Table B-7 the data are summarized by species for each sampling location and Table B-6 contains a summary of the combined data for each species collected at locations downstream of Cornwall. Summaries include sample size (N), mean and range of mercury concentations, and mean and range of fish length and weight for each sample. The results have been further summarized in Table 2 to facilitate reference to mercury levels determined for each species at the various sampling locations. Also given in Table 2 is the percentage of determinations in each sample that equaled or exceeded the federal guideline of 0.5 ppm, considered as the maximum level acceptable for regular human consumption.

Of the eleven species included, only 6 were adequately represented in both upstream and downstream collections. Rock bass and white perch were sampled only at Iroquois, upstream of Cornwall while walleye were sampled only from the Raisin River spawning run of April 1976 and are assumed to be representative of the Lake St. Francis walleye population.

TABLE 2. SUMMARY OF MERCURY CONCENTRATIONS IN FISH (mg/kg* of edible flesh) BY SPECIES AND SAMPLING LOCATION, ST. LAWRENCE RIVER, 1975.

SPECIES & LOCATION	MEAN	MAX.	MIN.	% ≥ 0.5 ppm	N
WALLEYE **					
Raisin R. (L. St. Francis)	1.32	3.40	0.60	100.0	19
NORTHERN PIKE					
A. Bainsville	0.62	1.73	0.32	50.0	12
B. Charlottenburgh	0.83	2.42	0.25	73.3	15
C. Summerstown	1.50	1.96	1.20	100.0	3
D. Glen Walter	0.73	0.91	0.40	66.7	3
E. Iroquois	0.62	2.00	0.24	50.0	24
A-D Combined	0.81	2.42	0.25	66.7	33
BASS***					
A. Bainsville	0.38	0.71	0.17	25.0	4
B. Charlottenburgh	0.51	0.91	0.18	37.5	8
C. Summerstown	-	-	-	-	0
D. Glen Walter	0.29	-	-	-	1
E. Iroqouis	0.86	1.07	0.60	100.0	4
A-D Combined	0.45	0.91	0.17	30.8	13
WHITE SUCKER					
Raisin R. (L. St. Francis)	0.51	0.79	0.20	53.3	15
E. Iroqouis	0.44	0.68	0.16	31.0	29
YELLOW PERCH					
A. Bainsville	0.36	0.98	0.13	10.7	56
B. Charlottenburgh	0.34	0.70	0.21	10.4	48
C. Summerstown	0.29	0.52	0.19	2.1	47
D. Glen Walter	0.32	0.52	0.18	4.2	48
E. Iroquois	0.40	1.11	0.19	18.5	27
A-D Combined	0.33	0.98	0.13	7.5	199

TABLE 2 cont'd

SPECIES & LOCATION	MEAN	MAX.	MIN.	% ≥ 0.5	N
WHITE PERCH					
E. Iroquois	0.23	0.39	0.11	0.0	22
ROCK BASS					
E. Iroquois	0.37	0.70	0.22	8.3	12
CRAPPIE					
A. Bainsville	0.19	0.74	0.10	2.1	47
B. Charlottenburgh	0.25	0.60	0.12	4.4	23
C. Summerstown	-	-	-	-	0
D. Glen Walter	0.24	0.31	0.16	0.0	2
E. Iroquois	0.20	0.45	0.06	0.0	49
A-D Combined	0.21	0.74	0.10	2.8	72
PUMPKINSEED					
A. Bainsville	0.24	0.41	0.07	0.0	50
B. Charlottenburgh	0.23	0.50	0.12	2.0	49
C. Summerstown	-	-	-	-	0
D. Glen Walter	0.28	0.50	0.15	2.0	50
E. Iroquois	0.23	0.63	0.11	2.9	34
A-D Combined	0.25	0.50	0.07	1.3	149
BULLHEAD					
A. Bainsville	0.19	0.29	0.02	0.0	49
B. Charlottenburgh	0.18	0.32	0.08	0.0	50
C. Summerstown	0.21	0.34	0.12	0.0	50
D. Glen Walter	0.20	0.30	0.09	0.0	50
E. Iroquois	0.21	0.35	0.11	0.0	25
A-D Combined	0.19	0.34	0.02	0.0	199

* mg/kg equals ppm

** Sampled in 1976

*** Largemouth and smallmouth bass combined.

Sample numbers are considered to be adequate for assessing prevailing mercury levels with the exception of northern pike which were poorly represented at two locations below Cornwall and largemouth and smallmouth bass which were poorly represented at all locations and for which the data are combined in Table 2.

Highest mercury concentrations, mean values in excess of 0.5 ppm at one or more sampling locations, occurred in the top piscivores (including walleye, pike, bass) and white sucker. Concentrations measured in 19 walleye ranged from 0.6 up to 3.4 ppm and averaged 1.32 ppm. Mean levels for northern pike ranged from 0.62 to 1.50 and 50% or more of individual determinations exceeded the level of 0.5 ppm. While data for bass cannot be considered conclusive due to small sample sizes, the results, nevertheless suggest that mercury concentrations are near or above 0.5 ppm. Eight specimens collected at Station B averaged 0.51 ppm while the combined sample of 13 specimens from downstream locations averaged 0.45 ppm. Four specimens from Station E above Cornwall averaged 0.86 ppm. Suckers from Lake St. Francis and Station E averaged 0.51 and 0.44 ppm, respectively.

Other species contained average mercury concentations in the range of 0.18 to 0.40 ppm at all sampling locations. Mean concentrations in all samples of pumpkinseed, brown bullhead, black crappie and white perch were in the order of 0.2 ppm and levels were less than 0.5 ppm in at least 95% of all

specimens tested. Somewhat higher mean levels were determined in yellow perch and rock bass ranging from 0.29 to 0.40 ppm. About 90 and 80 percent, respectively of the downstream and upstream samples of yellow perch were less than 0.5 ppm.

In summary, the above results indicate that relatively higher mercury concentrations occur in walleye, northern pike and likely largemouth and smallmouth bass. White sucker appears to have intermediate levels and other species tested had appreciably lower levels. The significance of these findings in terms of human consumption of fish and the effects of sources of mercury contamination at Cornwall on mercury levels in downstream versus upstream populations are discussed in the following two sections.

MERCURY CONCENTRATIONS IN RELATION TO SIZE OF FISH

A positive correlation of concentrations of mercury in fish (flesh) with size (length and weight) and age has been demonstrated in a number of studies. Because of the wide range of mercury concentrations evident within a single fish population, a sample estimate of mean mercury concentration in the population is of little value in terms of providing useful guidelines on the acceptability of fish for human consumption. Often, the size frequency distribution within samples is not representative of that in the population from which they were derived even though a wide range of size classes may be included. To overcome these difficulties the relationship between mercury concentration and size was

described by regression analysis, and used to estimate or predict mercury concentrations for selected size classes. On a statistical and theoretical basis, a geometric regression model has been shown to best describe the relationship.(5) Data for the St. Lawrence River were analyzed using linear, exponential and geometric models to describe mercury-length and mercury-weight relationships. In nearly all cases, highest correlation coefficients were obtained using a geometric expression to describe the mercury vs. length or weight relationship. Plots of mercury concentration versus fish length and weight are presented in Appendix B, Figures B-1 to B-7 for samples giving a significant correlation coefficient at the 95% confidence level. For each plot the regression line fitted by least squares is given along with the 95% prediction limits about the line and a horizontal line has been plotted indicating the 0.5 ppm level. Also plotted for further reference purposes is the relationship between length-weight and histograms showing the percent frequency distribution of mercury concentrations within the sample. Regression parameters are given in Tables B-1 to B-7.

For statistical reasons and because of the ease and practicability of determining fish lengths, mercury concentrations for selected length classes were calculated from the regression equation (for samples giving significant correlation coefficient) and are shown in Tables B-1 to B-7 under the heading of Mercury Concentrations in Relation to Fish Length. Letters A to D have been used to designate four mercury concentration intervals in the range of less than 0.5 ppm to greater than 1.5 ppm and are applied to length classes (given in inches) indicating estimated mercury concentration at the upper limit of the indicated size range. While this analysis is provided for various species at each of the sampling locations, special reference should be made to Table B-5 (Iroquois data), Table B-6 (combined downstream data) and Table B-7 (Lake St. Francis walleye) for the purpose of evaluating size ranges of fish species having acceptable levels.

With reference to the federal guideline of 0.5 ppm for unrestricted consumption and recent Ontario guidelines [13], recommending restricted rates of consumption of fish containing mercury concentrations in the range of 0.5 to 1.5 ppm, it is evident from this study that most sizes of the species included can be safely eaten at least on an occasional basis. Specifically it is apparent that common size ranges and more than 97 per cent of bullhead, pumpkinseed, white perch. and black crappie tested contain less than 0.5 ppm mercury and therefore, can be consumed on a regular basis.

Also, yellow perch up to 12 inches, pike up to 18 inches and largemouth bass from Lake St. Francis up to 14 inches in length are acceptable for regular consumption, whereas restricted consumption is recommended for larger fish of these species. Of the fish tested, only Lake St. Francis walleye larger than 22 inches should not be eaten at all. Recently published Ontario guidelines[13] should be referred to for more detail concerning recommended consumption rates for restricted size classes.

COMPARISON OF DOWNSTREAM AND UPSTREAM POPULATIONS

A comparison of mercury concentrations in fish populations below Cornwall relative to upstream populations is pertinent to an evaluation of the significance of continuing but reduced mercury loadings from the CIL chlor-alkali plant at Cornwall and the effects of residual mercury burdens in river sediments below Cornwall.

Valid comparisons between whole sample means cannot be made due to the dominance of the fish size factor in governing mercury concentrations and the usual dissimilarity between samples in terms of the size frequency distribution. Accordingly, an analysis was made of differences in mean mercury levels for specific size (length) classes of fish between sampling locations (Table 3). The analysis includes four species of fish occupying a range in trophic levels and represented

TABLE 3. COMPARISON OF MERCURY CONCENTRATIONS IN SELECTED SIZE RANGES OF FOUR SPECIES OF FISH FROM FIVE LOCATIONS IN THE ST. LAWRENCE RIVER. 1975. (Significant differences between means indicated by an asterisk).

SPECIES	LOCATION	MERCURY (ppm)[1] Mean	S.D.	LENGTH (cm)[2] Mean	S.D.	RANGE	N
Y. Perch	A	0.381	0.104	19.8	1.29	17.3-21.8	24
	B *	0.340	0.076	20.3	1.30	17.6-22.0	22
	C	0.302	0.049	21.6	1.43	19.0-24.2	19
	D *	0.327	0.079	21.6	1.16	19.0-25.1	19
	E	0.403	0.177	20.4	1.38	17.7-21.6	6
	ABCD	0.340	0.085	20.7	1.58	17.3-25.1	84
Bullhead	A	0.167	0.058	24.3	1.04	23.0-25.9	11
	B	0.155	0.032	24.4	0.66	23.0-25.9	15
	C * *	0.155	0.021	23.4	0.50	23.0-25.9	2
	D	0.183	0.040	24.9	0.94	23.0-25.9	11
	E *	0.204	0.060	24.0	0.96	23.0-25.9	17
	ABCD	0.168	0.042	24.6	0.91	23.0-25.9	39
Pike	A *	0.464	0.123	53.7	3.41	50.0-59.9	5
	B	0.674	0.154	54.7	3.02	50.0-59.9	7
	C	-	-	-	-	-	-
	D	0.400	-	56.7	-	-	1
	E	0.518	0.276	56.3	2.18	50.0-59.9	9
	ABCD	0.572	0.174	54.5	3.02	50.0-59.9	13
Sucker L. St.Francis		0.496	0.199	45.5	1.31	43.5-47.0	8
	E	0.481	0.115	44.5	1.51	43.0-47.0	13

1 ppm = mg/kg

2 1 cm = 0.394 inches

by adequate sample numbers at most sampling locations. The selection of the size interval for each species was based on maximizing the number of determinations within the size interval at all stations consistent with ensuring comparable size frequency distribution and mean lengths. In Table 3, the results are presented including mean mercury levels and length data for each sampling location and for the combined downstream locations. Statistically significant differences at the 95% probability level in mean mercury concentrations between stations and between the combined downstream (A,B,C,D) and upstream (E) stations are indicated. While six comparisons show significant differences, it is clear that there are no consistent trends in terms of higher concentrations at Station D relative to Station A nor are concentrations for downstream populations significantly greater than upstream populations. In the case of bullheads concentrations are apparently higher in the upstream population.

Based on these data and other data (unpublished) that show very similar levels of mercury in fish from the upper river and the Eastern Basin of Lake Ontario, it can be concluded that levels of mercury in fish from waters downstream of Cornwall are governed predominantly by background levels in the river and are not significantly elevated due to current mercury loading rates from Cornwall sources.

TRENDS SINCE 1970

A further objective of the present study is an evaluation of trends in fish mercury levels following action taken in 1970

to reduce mercury loadings at Cornwall. Based on findings of other studies which have shown relatively rapid declines in mercury levels for fish particularly in large river systems following controls on mercury pollution, similar trends would be expected for the Lake St. Francis portion of the St. Lawrence River. Such an evaluation can also lead to estimation of decline rates and possibly predictions of mercury levels in relation to future time intervals.

An attempt was made to collate fish mercury data for the 1970 period for purposes of comparing the results with the 1975 data base. However, a review of the available information has revealed various inadequacies in the earlier data base including a) availablility of only data summaries (instead of raw data sources) which for the most part provide only pooled information for populations upstream and downstream of Cornwall; b) the absence of length-weight data for the samples tested; and c) limited numbers of tests for most species. Consequently, definitive comparisons are not possible.

Notwithstanding these limitations, a review of the two sets of data nevertheless suggests that declines in mercury levels have probably occurred in at least some species. One comparison can be made with pooled data for all locations in the river reported by the OWRC for results up to January 1971 which indicate higher levels for northern pike (0.94),

yellow perch (0.62), and bass (1.20) relative to the 1975 data and a comparable level for bullhead (0.20). Sample sizes ranged from 10 to 40 determinations and a majority of these were probably collected from Lake St. Francis. A second comparison can be made with data reported for Lake St. Francis alone[6] and for which sample size varied from approximately 10 to 20 specimens. Levels for largemouth bass (1.20), northern pike (1.08), yellow perch (0.64), and bullhead (0.18) are similar to those noted above and again indicate relatively higher levels in 1970 with the exception of bullheads. A third comparison is based on two samples of Lake St. Francis walleye collected in 1970 and 1976, consisting of 22 and 19 specimens, respectively and for which mean lengths, ranges in length and length frequency distributions are similar. Average mercury concentration for the 1970 sample was 2.38 ppm as compared with 1.32 ppm for the 1976 sample. From the above comparisons it seems likely that mercury levels for the piscivorous and perhaps other species have declined appreciably since 1970. Levels in fish have probably reached a steady state considering the analysis given in the preceding section showing similar levels in upstream populations and the likelihood that concentrations in downstream populations are governed by prevailing background levels in the river. However, additional sampling in the future will be required to substantiate this point.

ADDITIONAL STUDIES

Additional data of significance to the present evaluation of mercury contamination of the St. Lawrence River is expected to be derived from continuing sampling and testing programs either planned or in the implementation stage in 1977. Sediment samples acquired at approximately 150 stations between Brockville and Morrisburg are scheduled for mercury analysis. These results will expand the sediment data base for this portion of the river and will provide an assessment of possible additional sources of mercury contributing to elevated levels of mercury in fish populations upstream of Cornwall. Additional fish sampling for mercury analysis in Lake St. Lawrence is scheduled by MNR with emphasis on those species for which present data are lacking or insufficient in order to further assess the relative level of mercury in these fish as compared with those from Lake St. Francis. Also, through assistance being provided by the St. Regis Indian Band Council arrangements have been made to acquire additional fish samples for mercury analysis. Species and sampling locations not represented in the 1975 sampling will be included. In addition to expanding the present data base, the results will be particularly meaningful in terms of further evaluating mercury levels in fish populations utilized by native peoples of the St. Regis reserve.

REFERENCES

1. Fimreite, N. 1970.
Mercury uses in Canada and their possible hazards as sources of mercury contamination. Env. Poll. 1, p. 119.

2. Ontario Water Resources Commission and Quebec Water Board, 1971.
Water quality and its control in the Ottawa River, Vol. 1, p. 112.

3. Parks, J.W. 1976.
Mercury in sediment and water in the Wabigoon-English River system 1970-1975. Ontario Ministry of the Environment.

4. Ontario Water Resources Commission, 1970.
Report on the mercury pollution of the St. Clair River system.

5. Ontario Ministry of the Environment, 1977.
The decline in mercury concentration in fish from Lake St. Clair, 1970-1976. Laboratory Services Branch, Report No. AQS77-3, 85 pp.

6. Ontario Water Resources Commission, 1970.
Mercury analyses of fish from eastern Lake Ontario and the St. Lawrence River, Division of Laboratories, mimeo, 4 pp.

7. Pascoe, D.J., 1976.
Environmental Protection Service/Ontario Ministry of the Environment joint mercury monitoring program. - CIL Cornwall. Environmental Protection Service, Ontario Region, M.S. Report # O.R.-4, 119 pp.

8. Anon, 1975.
A survey of the water quality of the St. Lawrence River adjacent to the City of Cornwall. An "Experience '75" project, May - August 1975, mimeo.

9. Thomas, R.L., 1974.
The distribution and transport of mercury in the sediments of the Laurentian Great Lakes system. in Proc. Int. Conf. on Transport of Persistent Chemicals in Aquatic Ecosystems, Part 1, N.R.C., 1-16.

10. Pers. comm. J. Pruner, District Officer, Industrial Abatement Section, Ministry of the Environment, Cornwall.

11. Rust, B.R. and D.G. Waslenchuk, 1974.
The distribution and transport of bed sediments and persistent pollutants in the Ottawa River, Canada, in Proc. Int. Conf. on Transport of Persistent Chemicals in Aquatic Ecosystems, Part 1, N.R.C., 25-40.

12. Townsend, D.R. et al, 1974.
Mercury transport by bed sediment movements, ibid, 47-51.

13. Anon, 1977.
Health implications of contaminants in fish, Government of Ontario, 48.

APPENDIX A

LIST OF COMMON AND SCIENTIFIC NAMES OF FISH SPECIES REFERRED TO IN THIS REPORT

COMMON NAME	SCIENTIFIC NAME
black crappie	*Pomoxis nigromaculatus*
brown bullhead	*Ictalurus nebulosus*
channel catfish	*Ictalurus punctatus*
largemouth bass	*Micropterus salmoides*
northern pike	*Esox lucius*
pumpkinseed	*Lepomis gibbosus*
rock bass	*Ambloplites rupestris*
smallmouth bass	*Micropterus dolomieui*
walleye	*Stizostedion vitreum*
white perch	*Morone americana*
white sucker	*Catostomus commersoni*
yellow perch	*Perca flavescens*

APPENDIX B

FISH MERCURY DATA SUMMARIES AND REGRESSION ANALYSIS BY SPECIES AND LOCATION.

Tables B1 - B7: - Mean and range of mercury concentrations, lengths, and weights; no. of analyses, classification of mercury concentration in relation to length; regression data.

Figures B1 - B7: - Frequency distribution of mercury levels and relationships between mercury - length, mercury - weight and length - weight.

INDEX

TABLE B-1

MERCURY DATA SUMMARY
ONTARIO MINISTRY OF THE ENVIRONMENT, LABORATORY SERVICES BRANCH

LOCATION: LAKE ONTARIO #5, 1975
BAINSVILLE , GLENGARRY COUNTY
LAT/LONG: 4511/7425

SPECIES	N	MERCURY CONC. MEAN	MERCURY CONC. RANGE	LENGTH (CM.) MEAN	LENGTH (CM.) RANGE	WEIGHT(GM.) MEAN	WEIGHT(GM.) RANGE
PIKE	12	0.62	0.32- 1.73	56.2	42.0- 79.6	1134	379- 2639
B. CRAPPIE*	47	0.19	0.10- 0.74	20.0	16.5- 29.0	139	62- 418
P'SEED *	50	0.24	0.07- 0.41	16.4	13.9- 19.9	114	61- 198
L.M. BASS	4	0.38	0.17- 0.71	28.4	20.5- 39.0	510	134- 1228
B.BULLHEAD*	49	0.18	0.02- 0.29	26.7	20.3- 31.5	272	100- 422
Y. PERCH *	56	0.36	0.13- 0.98	19.4	15.8- 24.3	93	48- 172

* SIZE SPECIFIC CLASSIFICATION AVAILABLE

MERCURY CONCENTRATION IN RELATION TO FISH LENGTH

	SIZE RANGE IN INCHES								
SPECIES	<6	6-8	8-10	10-12	12-14	14-18	18-22	22-26	26-30	>30
B. CRAPPIE	A	A	A	A	A	-	-	-	-	-
P'SEED	A	A	B	-	-	-	-	-	-	-
B.BULLHEAD	-	A	A	A	A	-	-	-	-	-
Y. PERCH	A	A	A	B	B	-	-	-	-	-

A MERCURY CONCENTRATION <0.5 PPM
B MERCURY CONCENTRATION 0.5-1.0 PPM
C MERCURY CONCENTRATION 1.0-1.5 PPM
D MERCURY CONCENTRATION >1.5 PPM
- MERCURY DATA NOT AVAILABLE FOR THIS SIZE

*******REGRESSION DATA*******

REGRESSION MODEL: HG=A0*L↑A1

SPECIES	A0	A1	R	STD LEN.	HG AT STD.
B. CRAPPIE	0.001248	1.66544	0.657	0	0.00
P'SEED	0.001099	1.90508	0.546	0	0.00
B.BULLHEAD	0.000058	2.42802	0.511	0	0.00
Y. PERCH	0.005337	1.40003	0.374	0	0.00

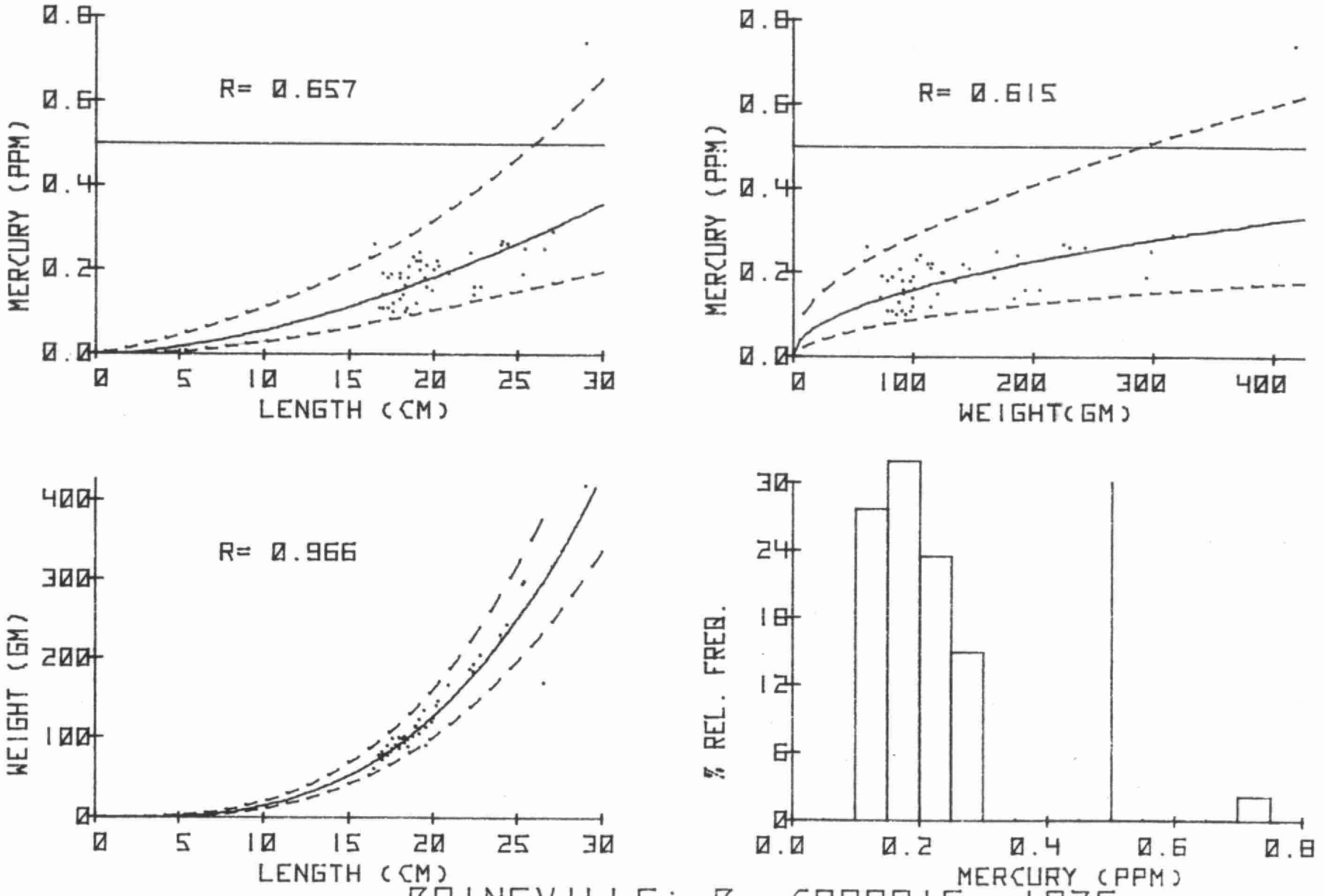

R= 0.657
MERCURY (PPM)
LENGTH (CM)
R= 0.615
MERCURY (PPM)
WEIGHT(GM)
R= 0.966
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
BAINSVILLE: B. CRAPPIE, 1975

FIGURE B1(a)

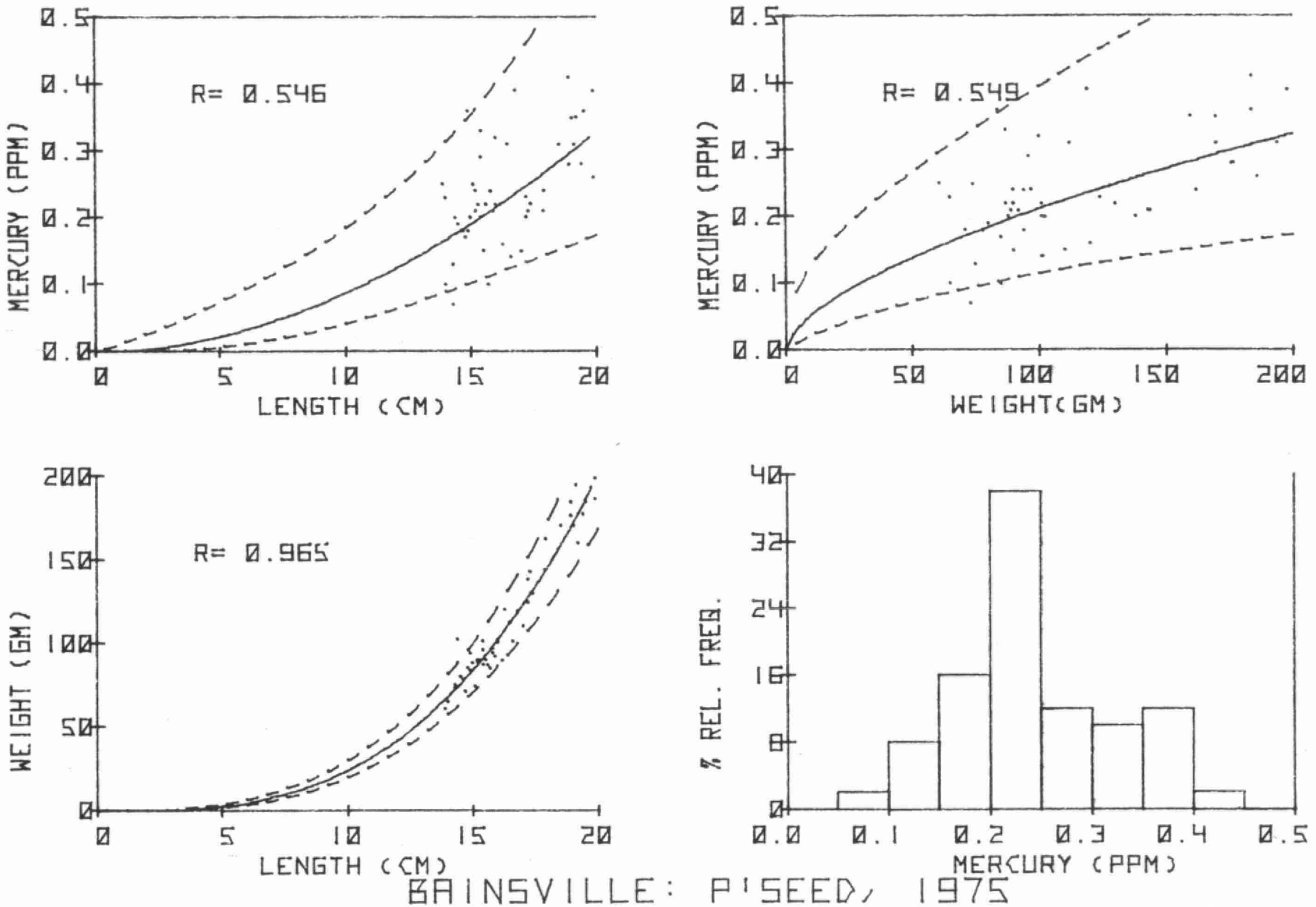

R= 0.546
MERCURY (PPM)
LENGTH (CM)
R= 0.549
MERCURY (PPM)
WEIGHT(GM)
R= 0.965
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
BAINSVILLE: PISEED, 1975

FIGURE B1(b)

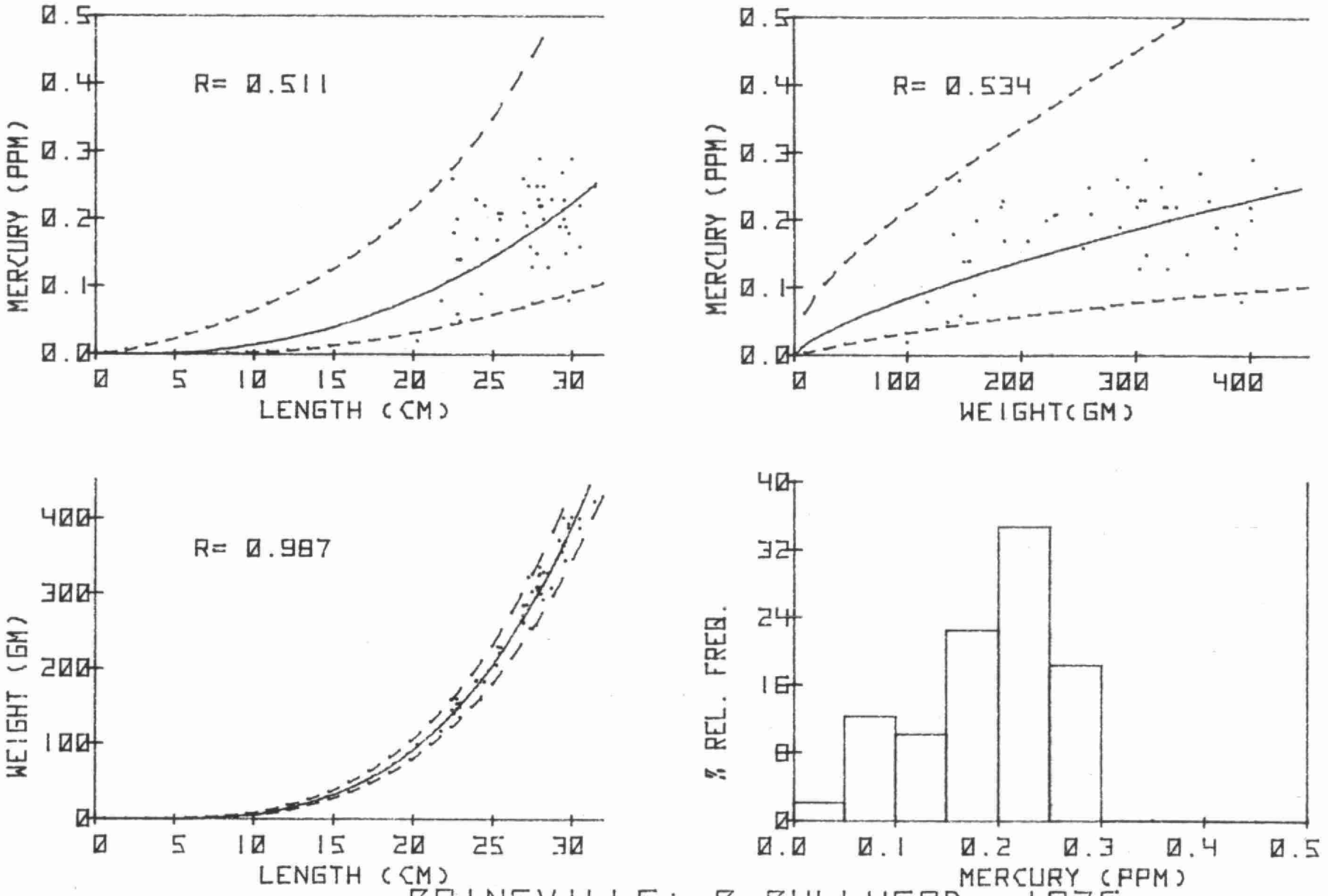

R= 0.511
MERCURY (PPM)
LENGTH (CM)
R= 0.534
MERCURY (PPM)
WEIGHT(GM)
R= 0.987
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
BAINSVILLE: B.BULLHEAD, 1975

FIGURE B1(c)

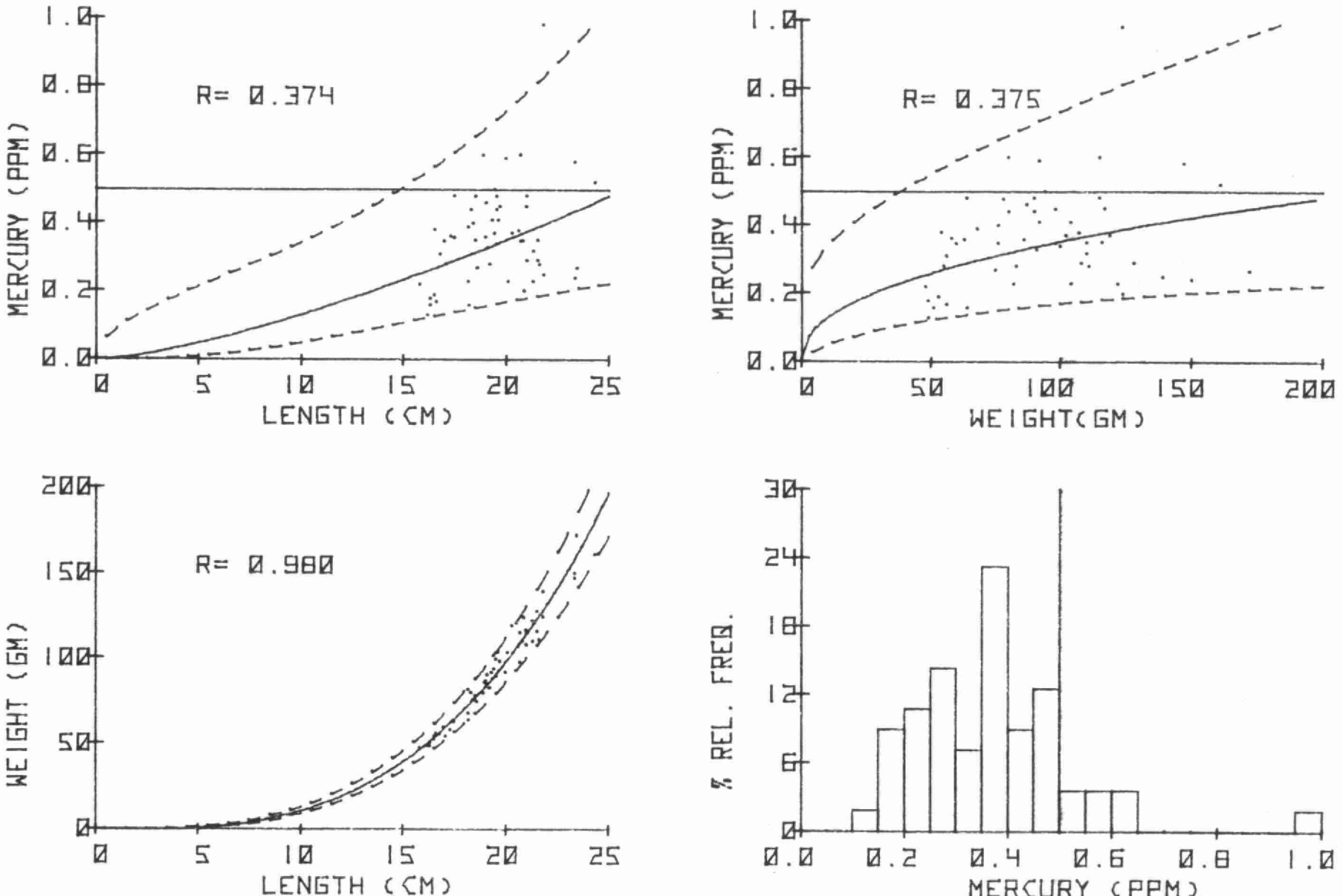

R= 0.374
MERCURY (PPM)
LENGTH (CM)
R= 0.375
WEIGHT(GM)
R= 0.980
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
BAINSVILLE: Y. PERCH, 1975

FIGURE B1(d)

TABLE B-2

MERCURY DATA SUMMARY
ONTARIO MINISTRY OF THE ENVIRONMENT, LABORATORY SERVICES BRANCH

LOCATION: LAKE ONTARIO #5, 1975
CHARLOTTENBURG, GLENGARRY COUNTY
LAT/LONG: 4510/7438

SPECIES	N	MERCURY CONC. MEAN	MERCURY CONC. RANGE	LENGTH (CM.) MEAN	LENGTH (CM.) RANGE	WEIGHT(GM.) MEAN	WEIGHT(GM.) RANGE
L.M. BASS *	8	0.51	0.18- 0.91	30.2	21.5- 38.8	548	216- 1088
B. CRAPPIE*	23	0.25	0.12- 0.60	20.1	15.0- 30.0	141	50- 500
PIKE *	15	0.83	0.25- 2.42	55.2	30.0- 81.0	1178	390- 3430
Y. PERCH *	48	0.34	0.20- 0.70	20.2	16.6- 23.2	114	62- 168
B.BULLHEAD*	50	0.18	0.08- 0.32	26.9	21.1- 35.5	300	130- 719
P'SEED *	49	0.23	0.12- 0.50	17.0	14.5- 22.1	129	78- 275

* SIZE SPECIFIC CLASSIFICATION AVAILABLE

MERCURY CONCENTRATION IN RELATION TO FISH LENGTH

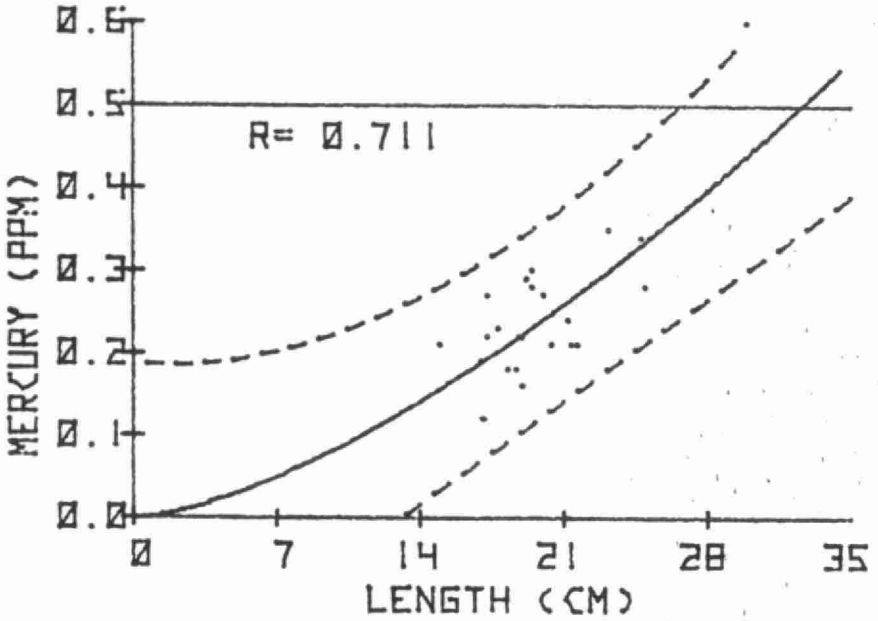
	SIZE RANGE IN INCHES								
SPECIES	<6	6-8	8-10	10-12	12-14	14-18	18-22	22-26	26-30	>30
L.M. BASS	-	A	A	A	B	B	-	-	-	-
B. CRAPPIE	A	A	A	A	B	-	-	-	-	-
PIKE	-	-	-	A	A	B	B	C	C	D
Y. PERCH	A	A	A	B	B	-	-	-	-	-
B.BULLHEAD	-	A	A	A	A	A	-	-	-	-
P'SEED	A	A	A	-	-	-	-	-	-	-

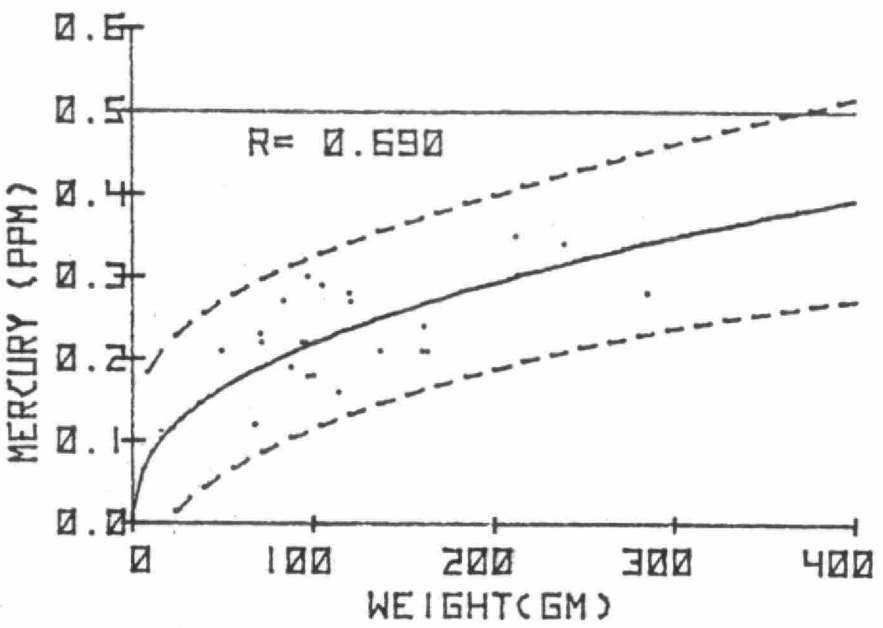
A MERCURY CONCENTRATION <0.5 PPM
B MERCURY CONCENTRATION 0.5-1.0 PPM
C MERCURY CONCENTRATION 1.0-1.5 PPM
D MERCURY CONCENTRATION >1.5 PPM
\- MERCURY DATA NOT AVAILABLE FOR THIS SIZE

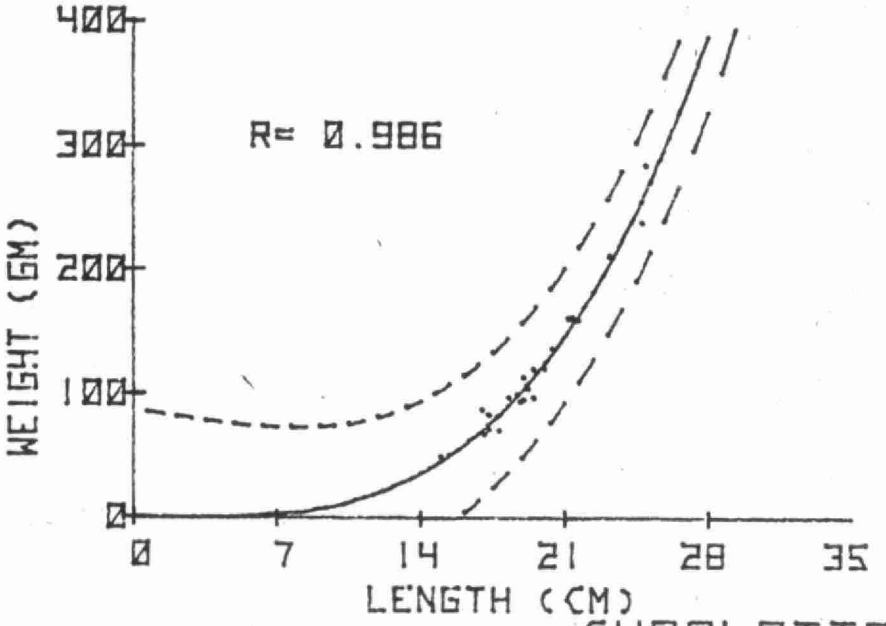
*******REGRESSION DATA*******

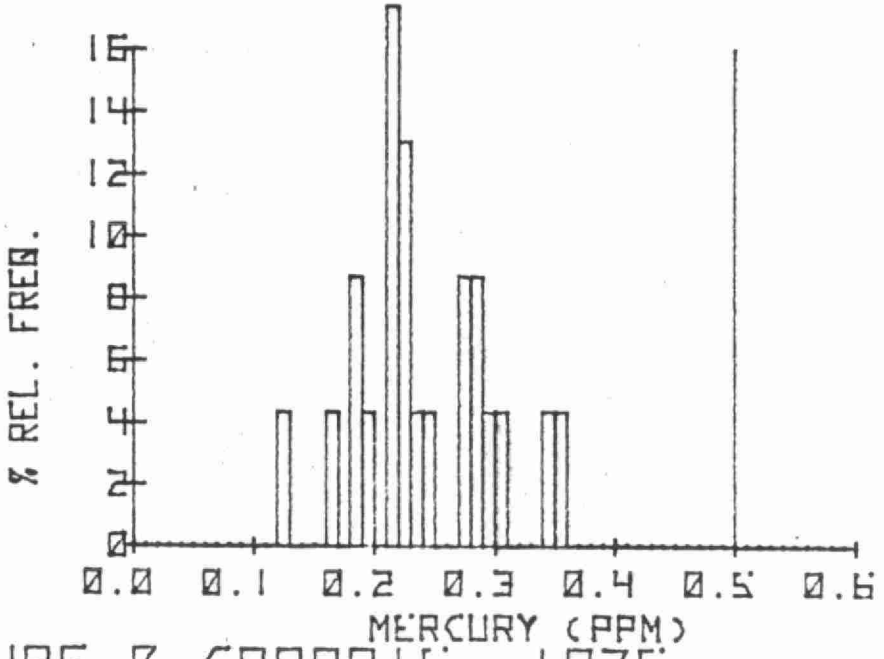
REGRESSION MODEL: HG=A0*L↑A1

SPECIES	A0	A1	R	STD LEN.	HG AT STD.
L.M. BASS	0.002276	1.56757	0.669	0	0.00
B. CRAPPIE	0.002824	1.48519	0.711	0	0.00
PIKE	0.000351	1.90290	0.780	60	0.85
Y. PERCH	0.002599	1.61021	0.440	0	0.00
B.BULLHEAD	0.011393	0.83486	0.405	0	0.00
P'SEED	0.006916	1.23083	0.401	0	0.00



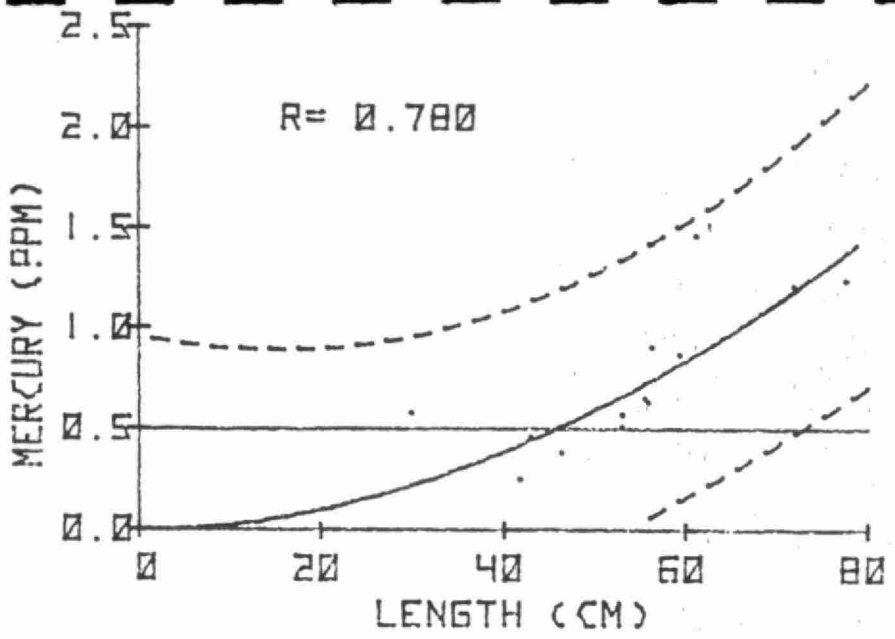


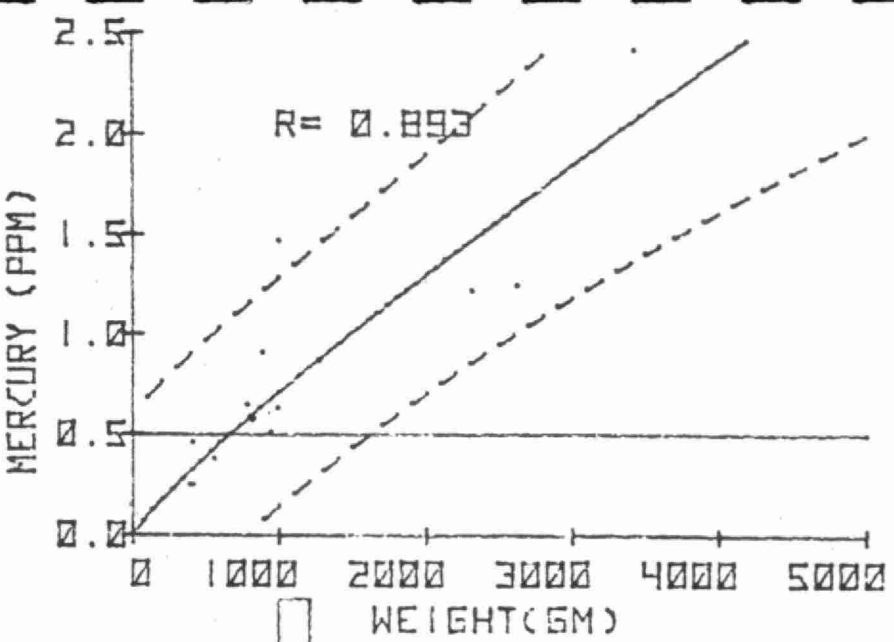


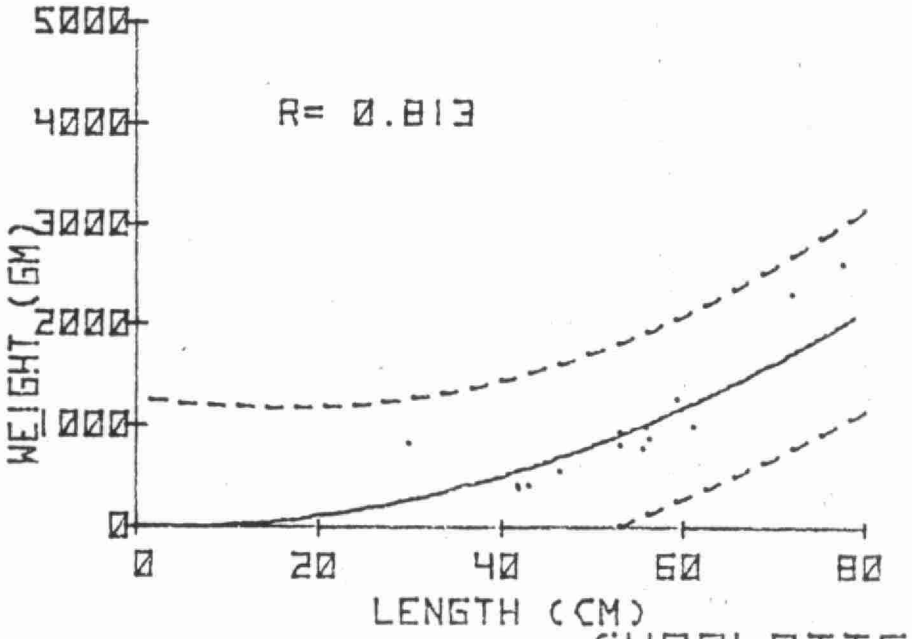


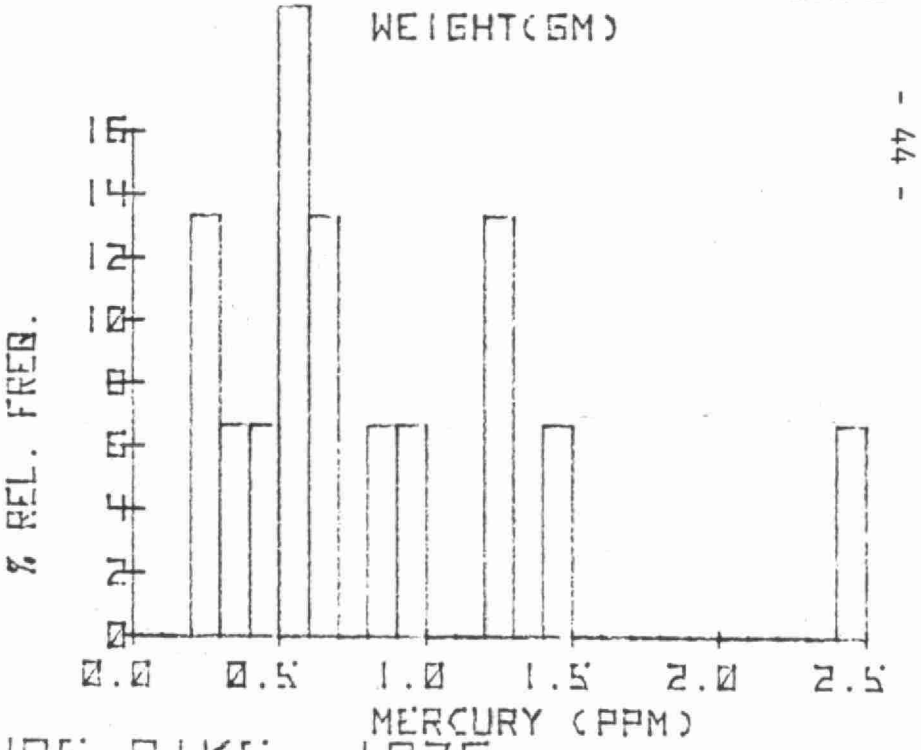
CHARLOTTENBURG B. CRAPPIE, 1975

FIGURE B2(a)









CHARLOTTENBURG PIKE, 1975

FIGURE B2(b)

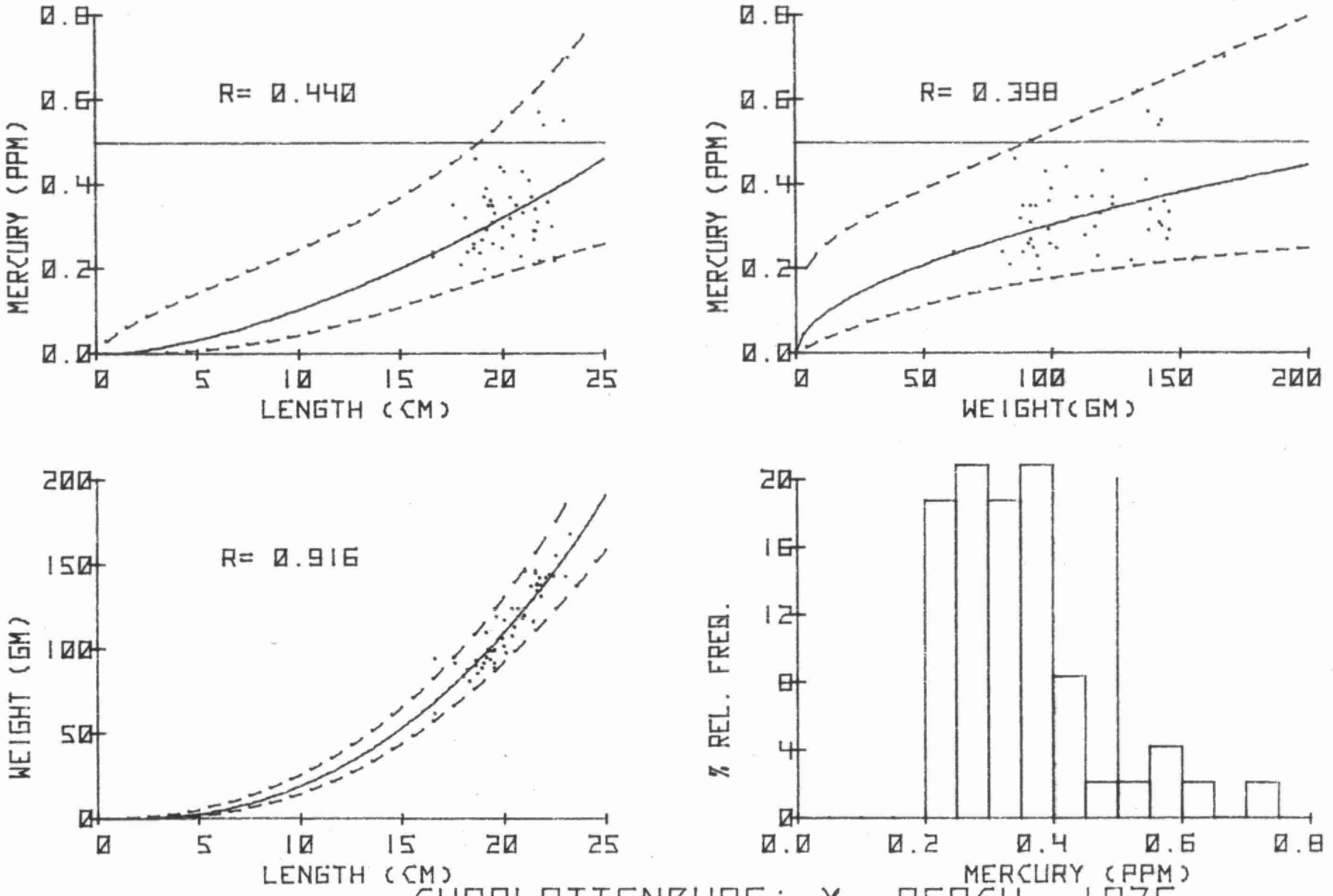
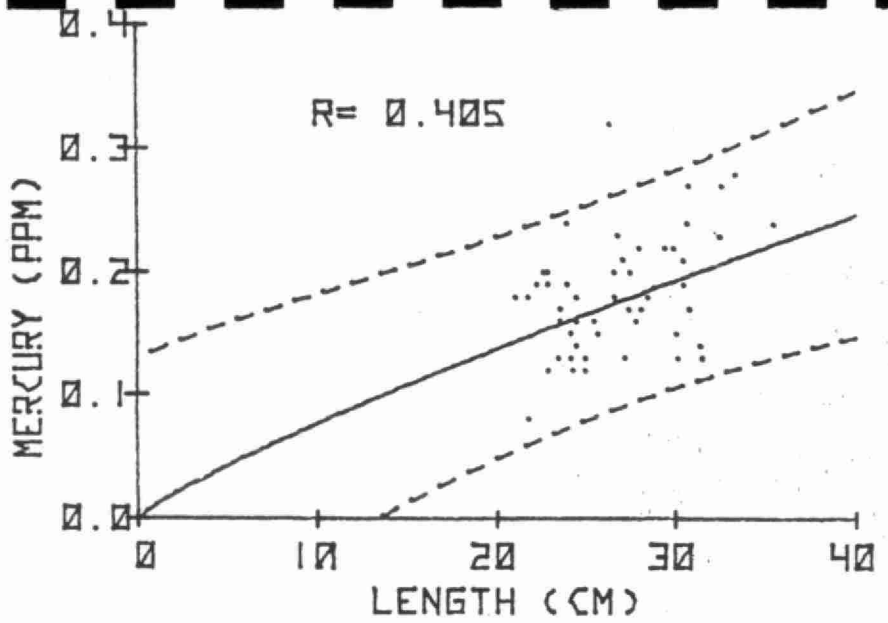
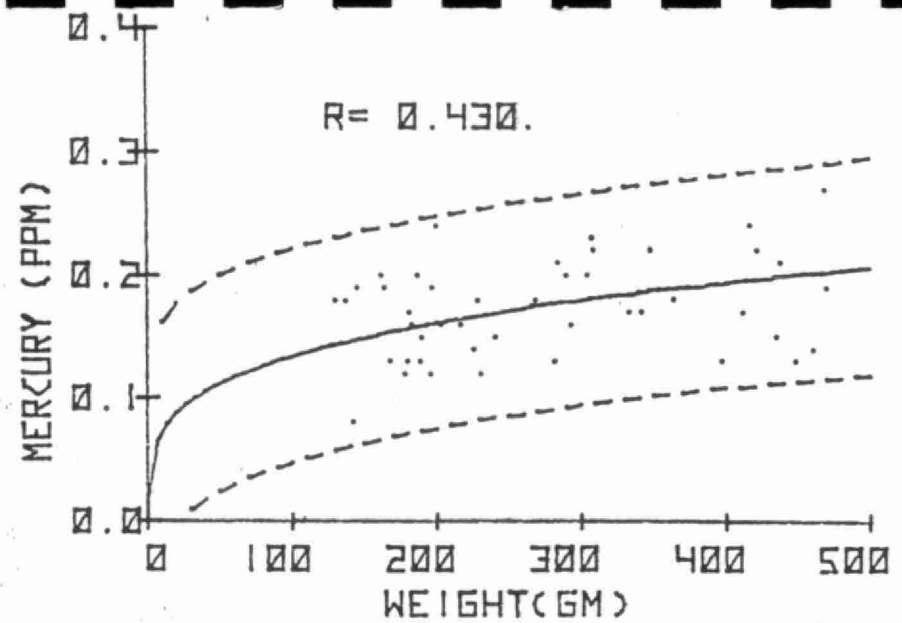
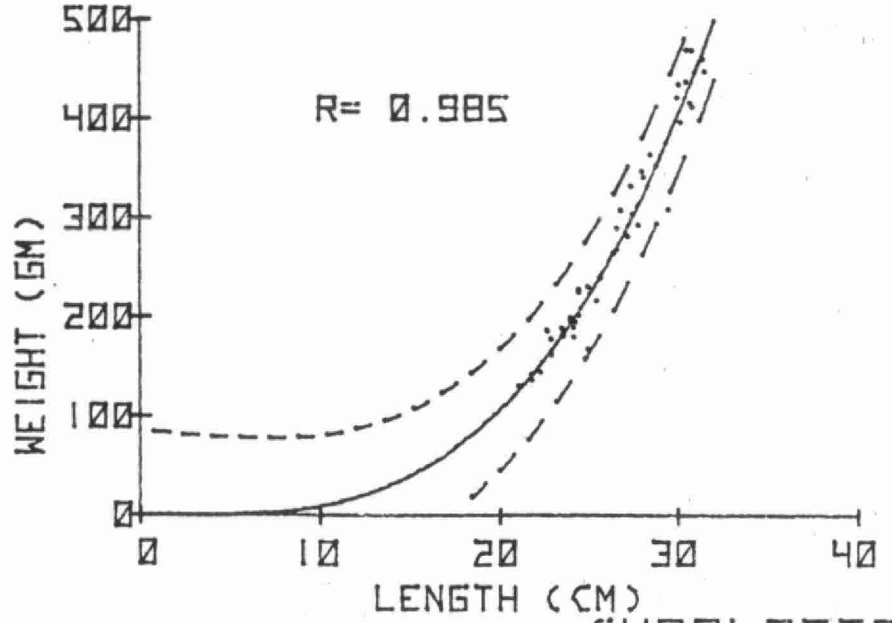
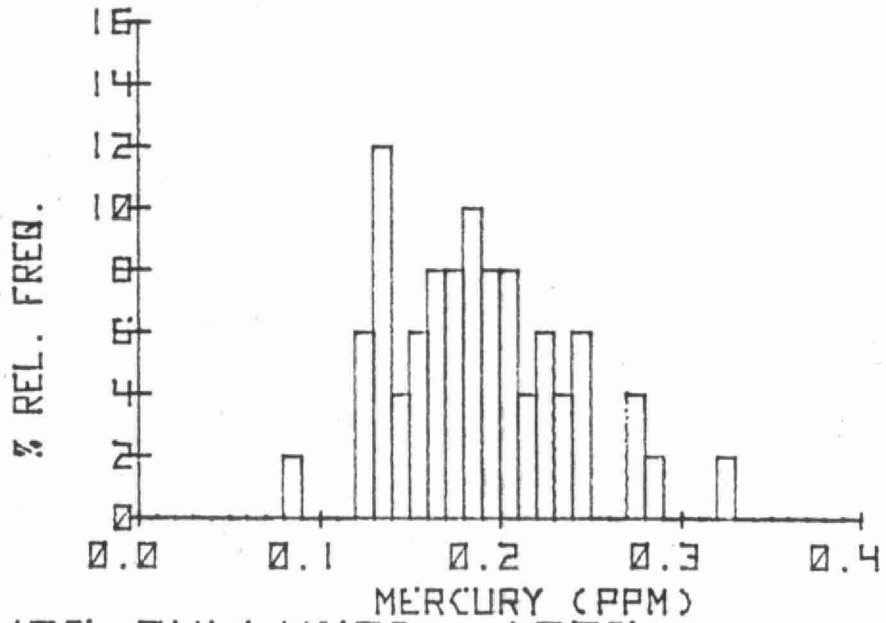

R= 0.440
MERCURY (PPM)
LENGTH (CM)
R= 0.398
MERCURY (PPM)
WEIGHT(GM)
R= 0.916
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
CHARLOTTENBURG: Y. PERCH, 1975

FIGURE B2(c)



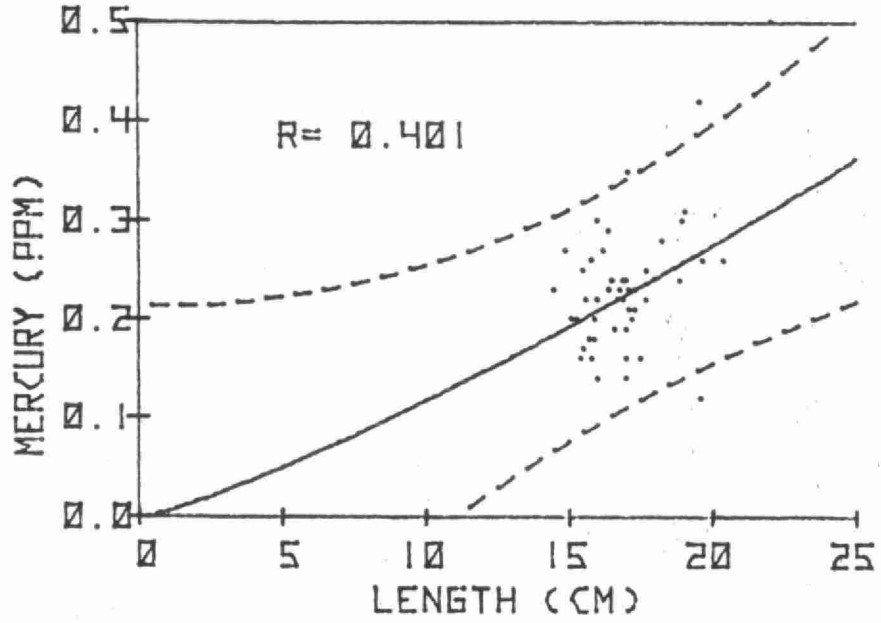


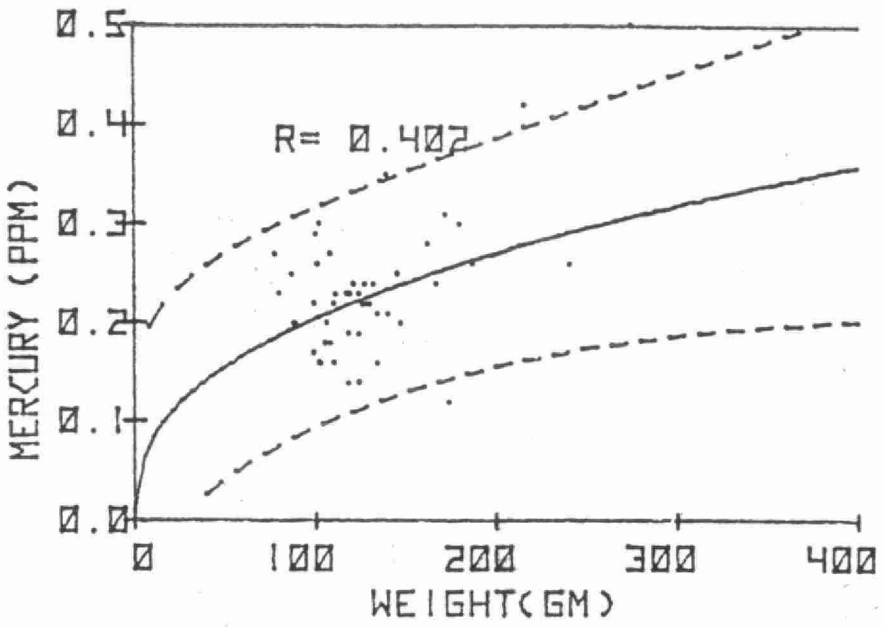


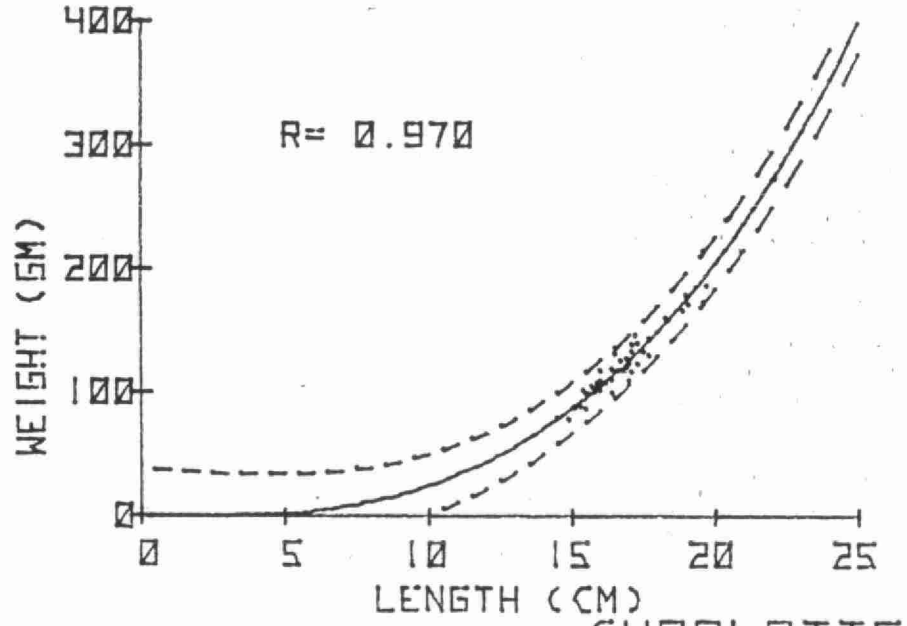


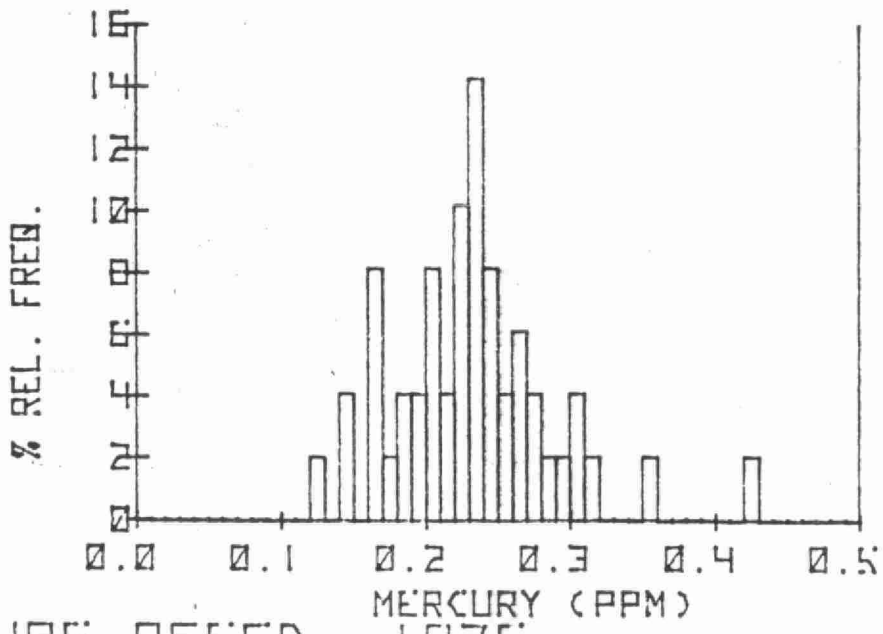
CHARLOTTENBURG BULLHEAD, 1975

FIGURE B2(d)









CHARLOTTENBURG PSEED, 1975

FIGURE B2(e)

TABLE B-3

MERCURY DATA SUMMARY
ONTARIO MINISTRY OF THE ENVIRONMENT, LABORATORY SERVICES BRANCH

LOCATION: LAKE ONTARIO #5, 1975
SUMMERSTOWN , GLENGARRY COUNTY
LAT/LONG: 4504/7433

SPECIES	N	MERCURY CONC. MEAN	MERCURY CONC. RANGE	LENGTH (CM.) MEAN	LENGTH (CM.) RANGE	WEIGHT(GM.) MEAN	WEIGHT(GM.) RANGE
B.BULLHEAD*	48	0.20	0.12- 0.34	30.8	22.0- 35.0	452	128- 727
Y. PERCH *	47	0.29	0.19- 0.52	21.1	18.0- 26.9	133	80- 253
PIKE	2	1.58	1.20- 1.96	73.3	73.0- 73.6	2405	2343- 2468

* SIZE SPECIFIC CLASSIFICATION AVAILABLE

MERCURY CONCENTRATION IN RELATION TO FISH LENGTH

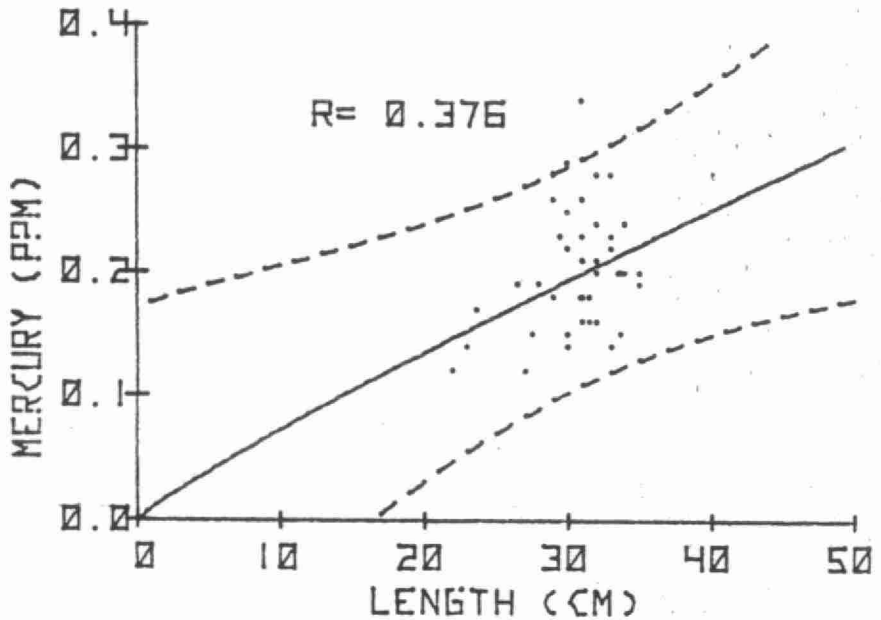
	SIZE RANGE IN INCHES								
SPECIES	<6	6-8	8-10	10-12	12-14	14-18	18-22	22-26	26-30	>30
B.BULLHEAD	-	A	A	A	A	A	-	-	-	-
Y. PERCH	-	A	A	A	B	-	-	-	-	-

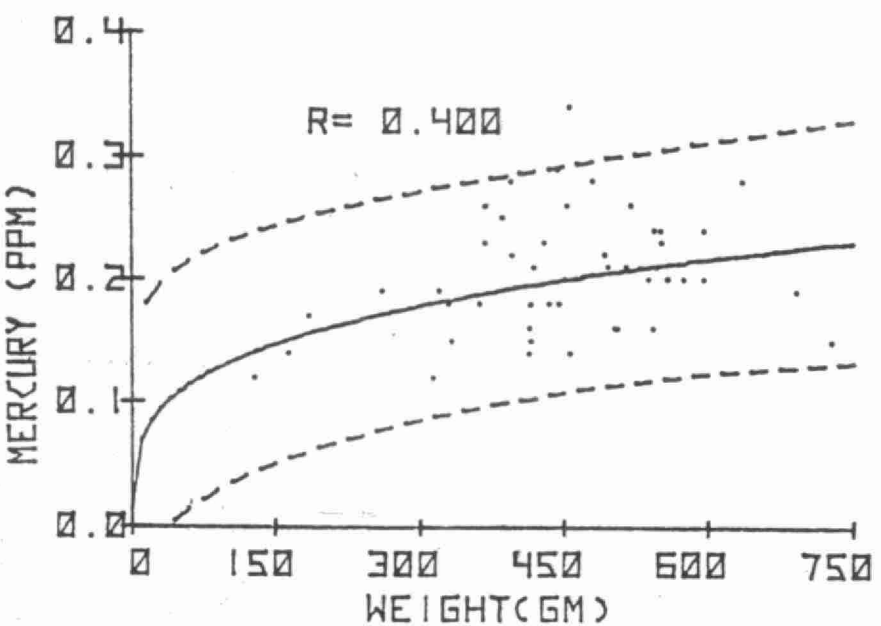
A MERCURY CONCENTRATION <0.5 PPM
B MERCURY CONCENTRATION 0.5-1.0 PPM
C MERCURY CONCENTRATION 1.0-1.5 PPM
D MERCURY CONCENTRATION >1.5 PPM
\- MERCURY DATA NOT AVAILABLE FOR THIS SIZE

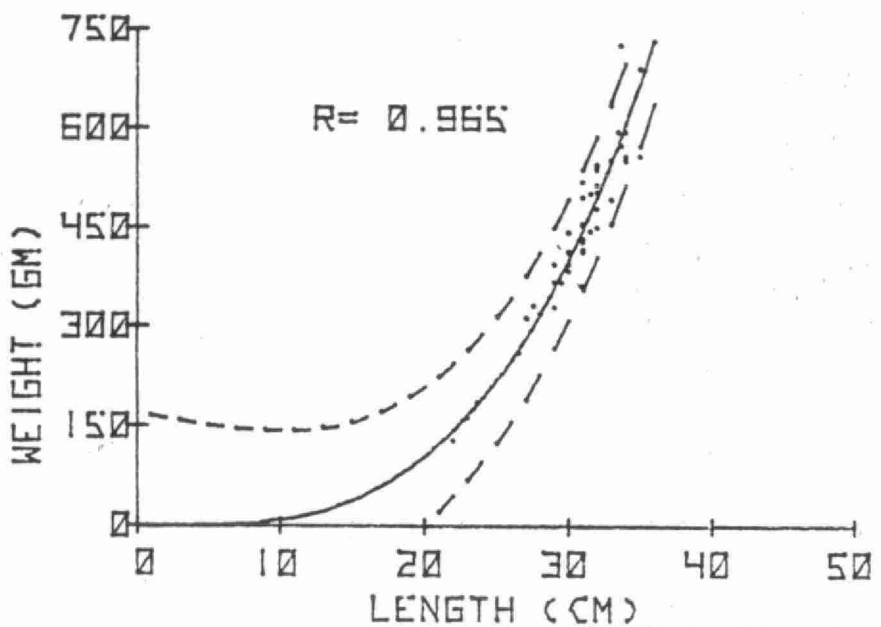
*******REGRESSION DATA*******

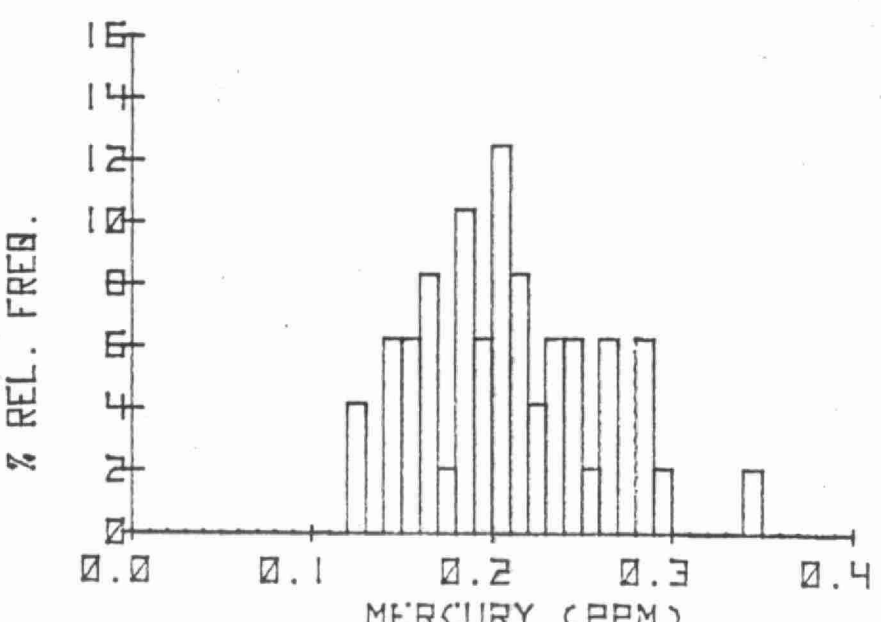
REGRESSION MODEL: HG=A0*L↑A1

SPECIES	A0	A1	R	STD LEN.	HG AT STD.
B.BULLHEAD	0.009139	0.89903	0.376	0	0.00
Y. PERCH	0.006567	1.23629	0.467	0	0.00



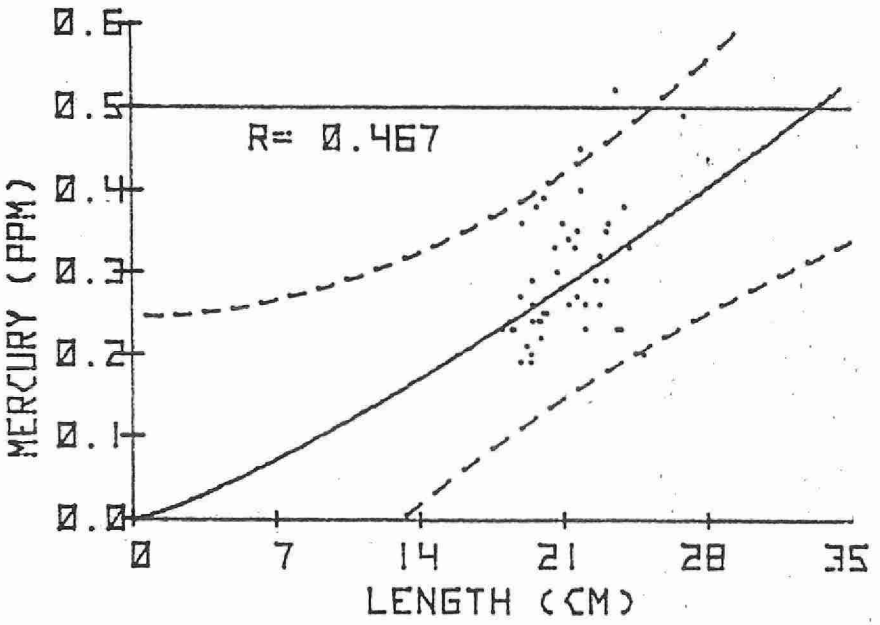


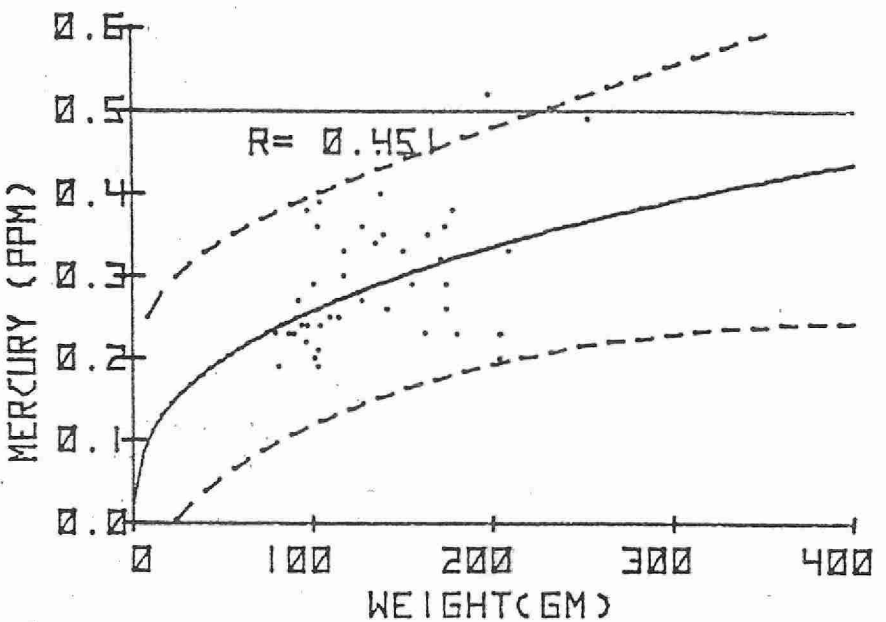


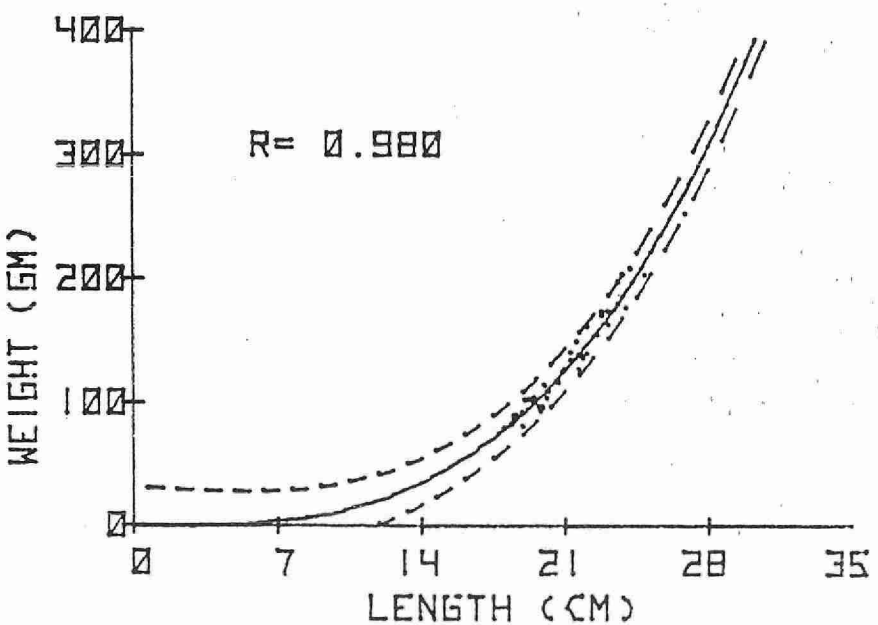


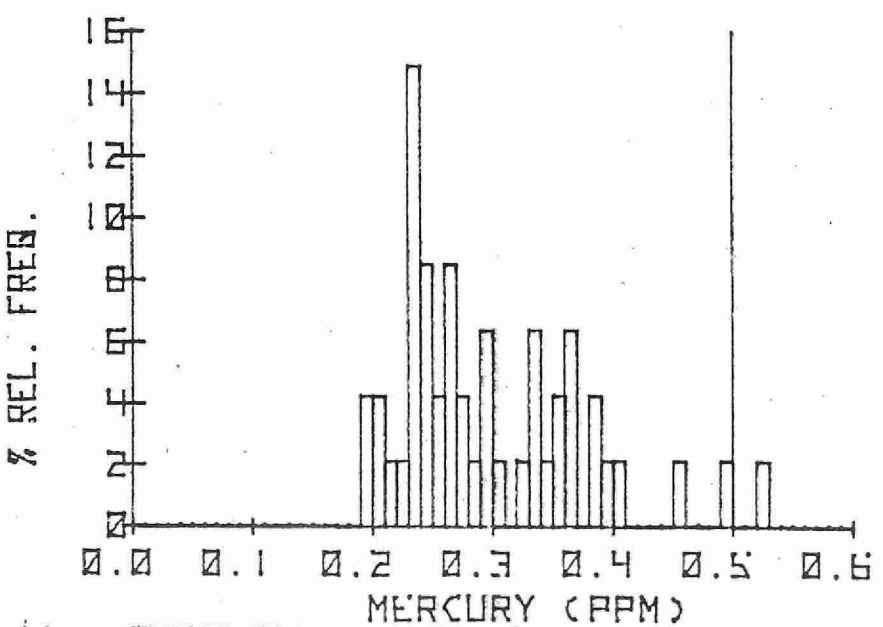
SUMMERSTOWN BULLHEAD, 1975

FIGURE B3(a)









SUMMERSTOWN Y. PERCH, 1975

FIGURE B3(b)

TABLE B-4

MERCURY DATA SUMMARY
ONTARIO MINISTRY OF THE ENVIRONMENT, LABORATORY SERVICES BRANCH

LOCATION: LAKE ONTARIO #5, 1975
GLEN WALTER , GLENGARRY COUNTY
LAT/LONG: 4502/7437

SPECIES	N	MERCURY CONC. MEAN	MERCURY CONC. RANGE	LENGTH (CM.) MEAN	LENGTH (CM.) RANGE	WEIGHT(GM.) MEAN	WEIGHT(GM.) RANGE
Y. PERCH *	48	0.32	0.18- 0.52	20.7	17.2- 26.4	122	61- 303
B.BULLHEAD*	50	0.20	0.09- 0.30	28.5	19.5- 37.0	383	121- 724
PIKE	3	0.73	0.40- 0.91	63.4	56.7- 69.0	1633	1098- 2168
P'SEED *	50	0.28	0.15- 0.50	17.2	12.7- 21.3	150	53- 298
B. CRAPPIE	2	0.24	0.16- 0.31	23.8	21.5- 26.0	227	158- 296

* SIZE SPECIFIC CLASSIFICATION AVAILABLE

MERCURY CONCENTRATION IN RELATION TO FISH LENGTH

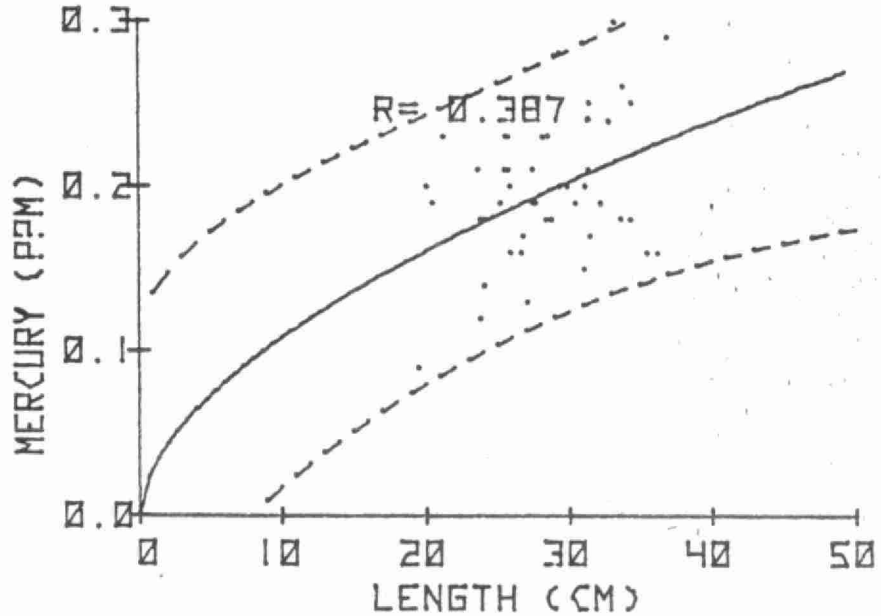
	SIZE RANGE IN INCHES								
SPECIES	<6	6-8	8-10	10-12	12-14	14-18	18-22	22-26	26-30	>30
Y. PERCH	-	A	A	A	B	-	-	-	-	-
B.BULLHEAD	-	A	A	A	A	A	-	-	-	-
P'SEED	A	A	A	-	-	-	-	-	-	-

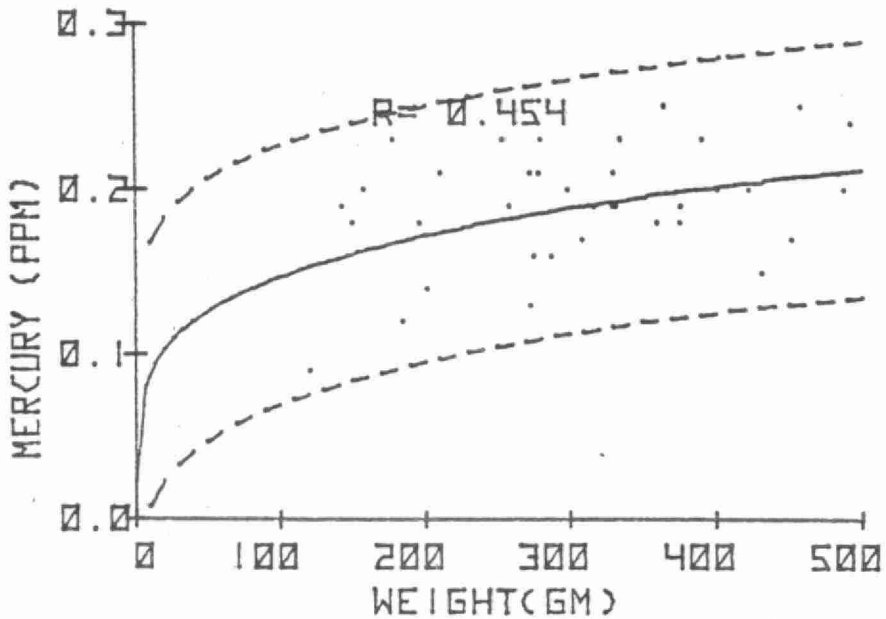
A MERCURY CONCENTRATION <0.5 PPM
B MERCURY CONCENTRATION 0.5-1.0 PPM
C MERCURY CONCENTRATION 1.0-1.5 PPM
D MERCURY CONCENTRATION >1.5 PPM
\- MERCURY DATA NOT AVAILABLE FOR THIS SIZE

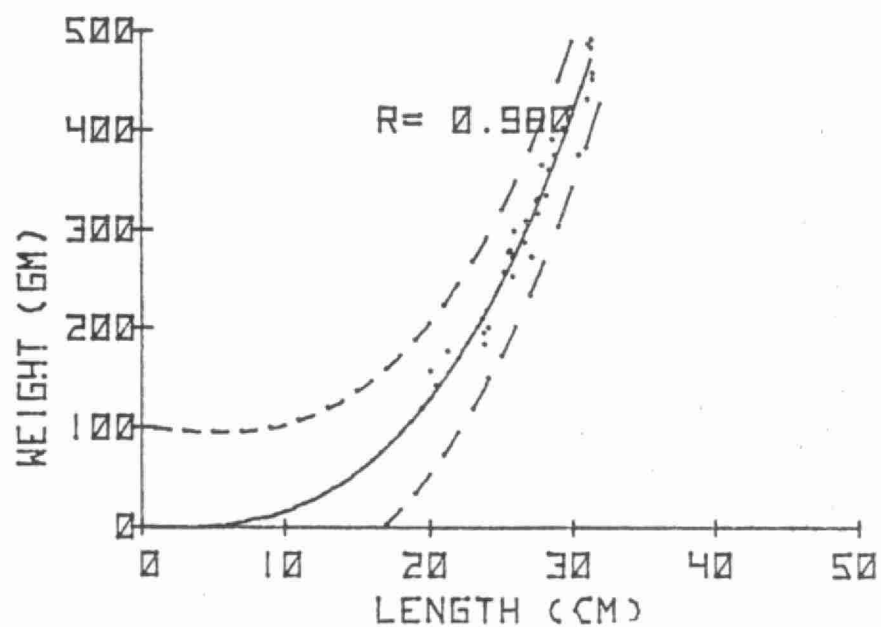
*******REGRESSION DATA*******

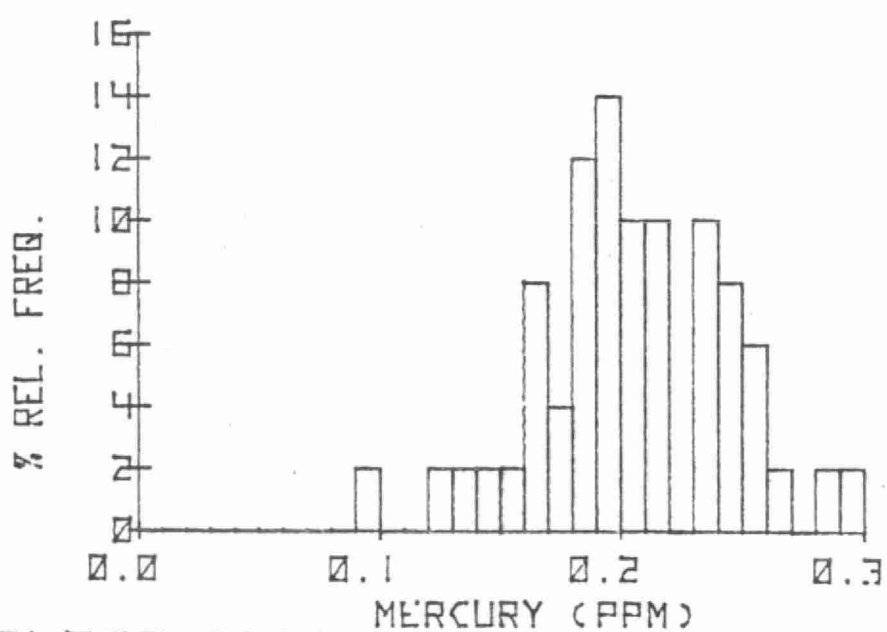
REGRESSION MODEL: HG=A0*L↑A1

SPECIES	A0	A1	R	STD LEN.	HG AT STD.
Y. PERCH	0.015027	0.99808	0.430	0	0.00
B.BULLHEAD	0.029322	0.56954	0.387	0	0.00
P'SEED	0.002757	1.60576	0.693	0	0.00









GLEN WALTER BULLHEAD, 1975

FIGURE B4(a)

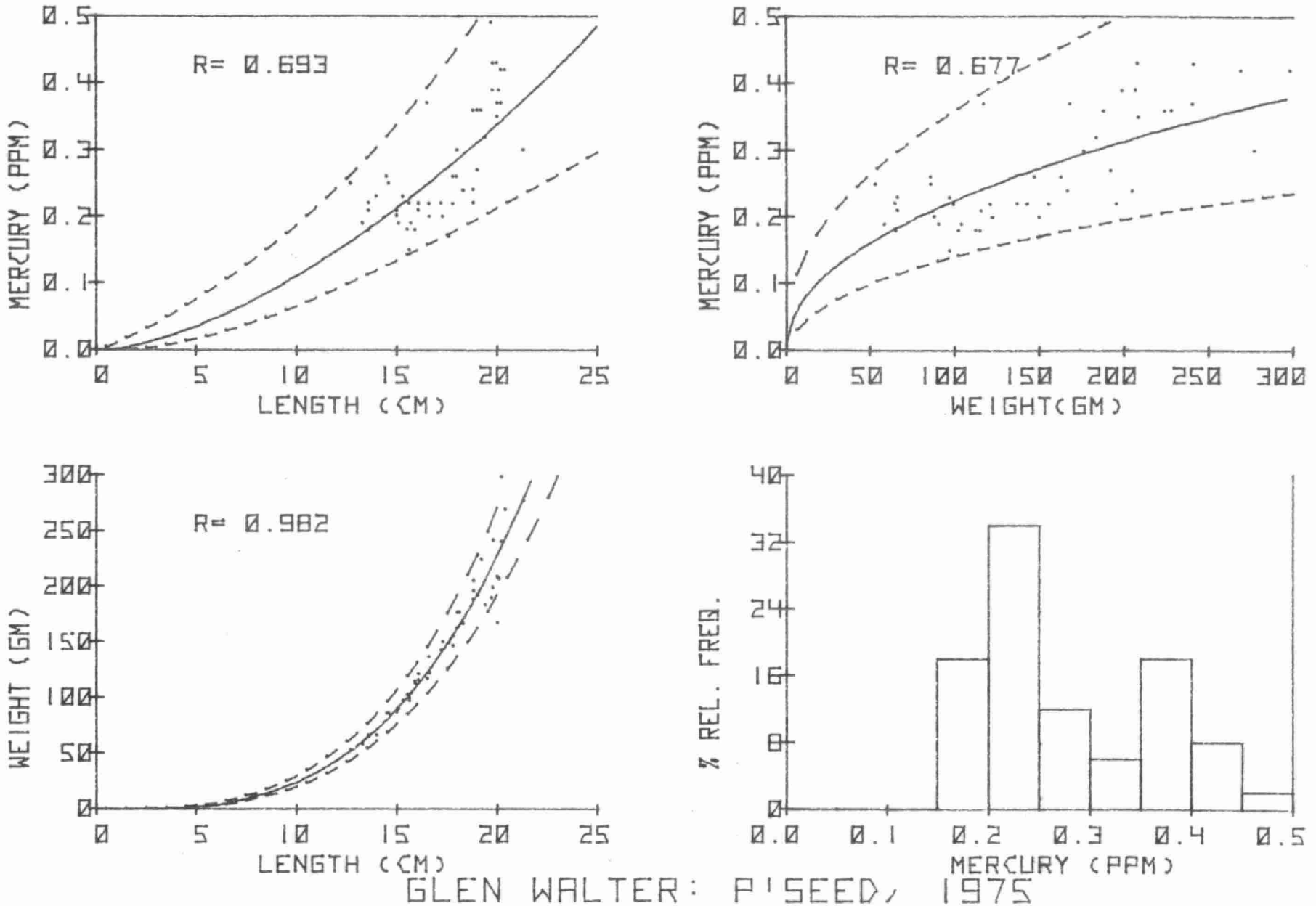
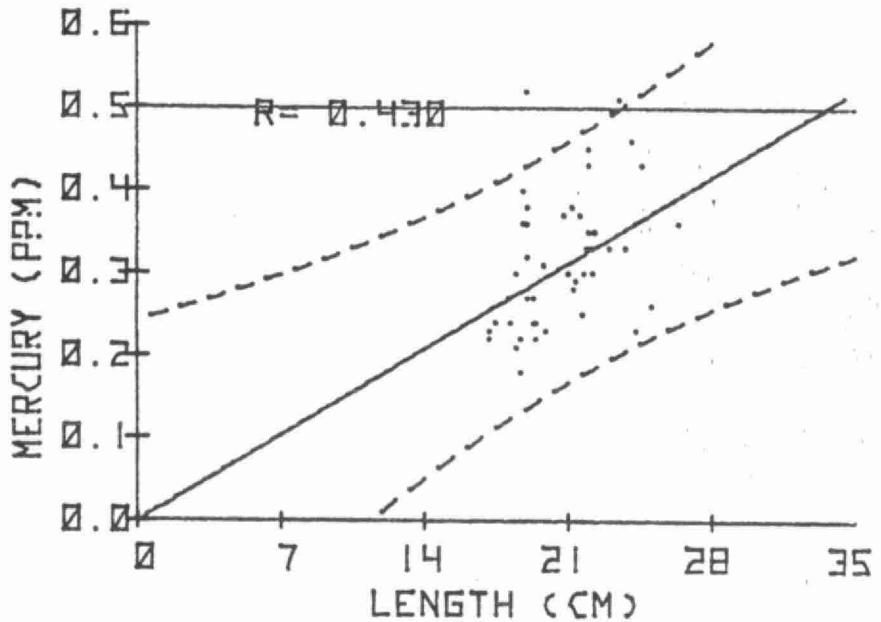
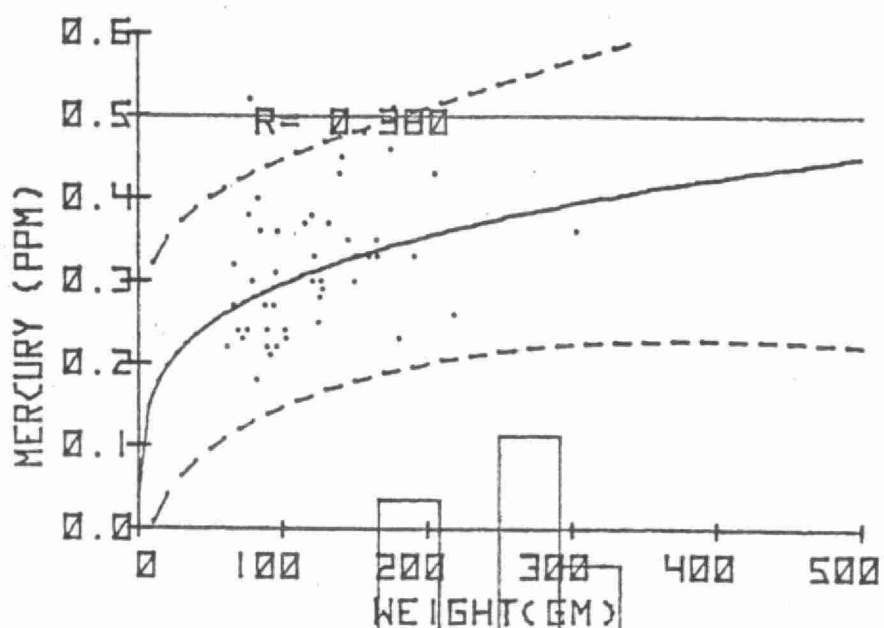
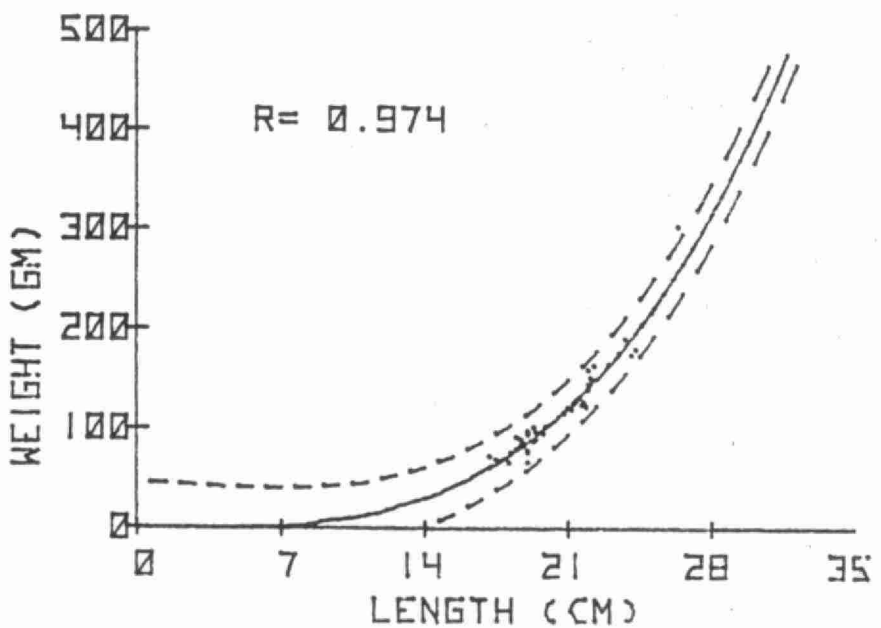
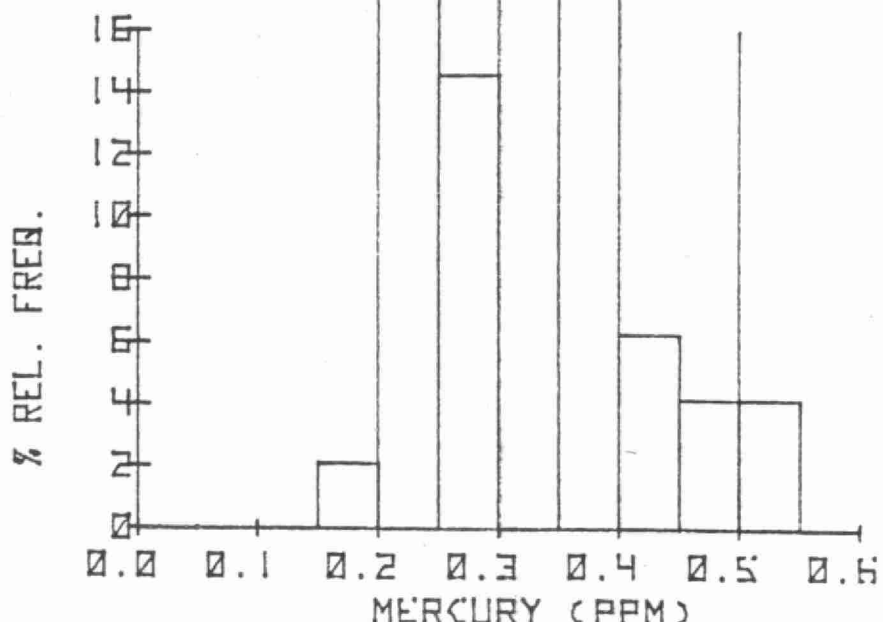

R= 0.693
MERCURY (PPM)
LENGTH (CM)
R= 0.677
MERCURY (PPM)
WEIGHT(GM)
R= 0.982
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
GLEN WALTER: P'SEED, 1975

FIGURE B4(b)









GLEN WALTER PERCH, 1975

FIGURE B4(c)

TABLE B-5

MERCURY DATA SUMMARY
ONTARIO MINISTRY OF THE ENVIRONMENT, LABORATORY SERVICES BRANCH

LOCATION: LAKE ONTARIO #5, 1975
IROQUOIS , DUNDAS COUNTY
LAT/LONG: 4451/7519

SPECIES		N	MERCURY CONC. MEAN	MERCURY CONC. RANGE		LENGTH (CM.) MEAN	LENGTH (CM.) RANGE		WEIGHT(GM.) MEAN	WEIGHT(GM.) RANGE	
W. SUCKER		29	0.44	0.16-	0.68	42.4	15.6-	60.0	892	601-	2258
P'SEED	*	34	0.23	0.11-	0.63	16.0	12.8-	18.4	101	54-	170
PIKE	*	24	0.62	0.17-	2.00	60.7	37.0-	87.0	1666	295-	4124
R. BASS		12	0.37	0.22-	0.70	17.9	15.5-	20.0	116	68-	162
S.M. BASS		3	0.94	0.79-	1.07	37.3	36.2-	39.0	838	738-	1003
Y. PERCH	*	27	0.40	0.19-	1.11	21.4	17.6-	29.5	125	60-	315
W. PERCH		22	0.23	0.11-	0.39	19.8	17.0-	24.0	121	68-	236
B. CRAPPIE	*	49	0.19	0.06-	0.45	22.0	18.8-	26.6	166	96-	342
B.BULLHEAD		25	0.21	0.11-	0.35	23.6	20.3-	27.0	157	97-	250
L.M. BASS		1	0.60	-	-	33.6	-	-	723	-	-

* SIZE SPECIFIC CLASSIFICATION AVAILABLE

MERCURY CONCENTRATION IN RELATION TO FISH LENGTH

	SIZE RANGE IN INCHES									
SPECIES	<6	6-8	8-10	10-12	12-14	14-18	18-22	22-26	26-30	>30
P'SEED	A	A	-	-	-	-	-	-	-	-
PIKE	-	-	-	-	A	A	A	B	B	C
Y. PERCH	-	A	B	B	C	-	-	-	-	-
B. CRAPPIE	-	A	A	A	B	-	-	-	-	-

A MERCURY CONCENTRATION <0.5 PPM
B MERCURY CONCENTRATION 0.5-1.0 PPM
C MERCURY CONCENTRATION 1.0-1.5 PPM
D MERCURY CONCENTRATION >1.5 PPM
- MERCURY DATA NOT AVAILABLE FOR THIS SIZE

*******REGRESSION DATA*******

REGRESSION MODEL: HG=A0*L↑A1

SPECIES	A0	A1	R	STD LEN.	HG AT STD.
P'SEED	0.000132	2.65999	0.582	0	0.00
PIKE	0.000222	1.89434	0.623	60	0.52
Y. PERCH	0.000110	2.65219	0.682	0	0.00
B. CRAPPIE	0.000019	2.97136	0.639	0	0.00

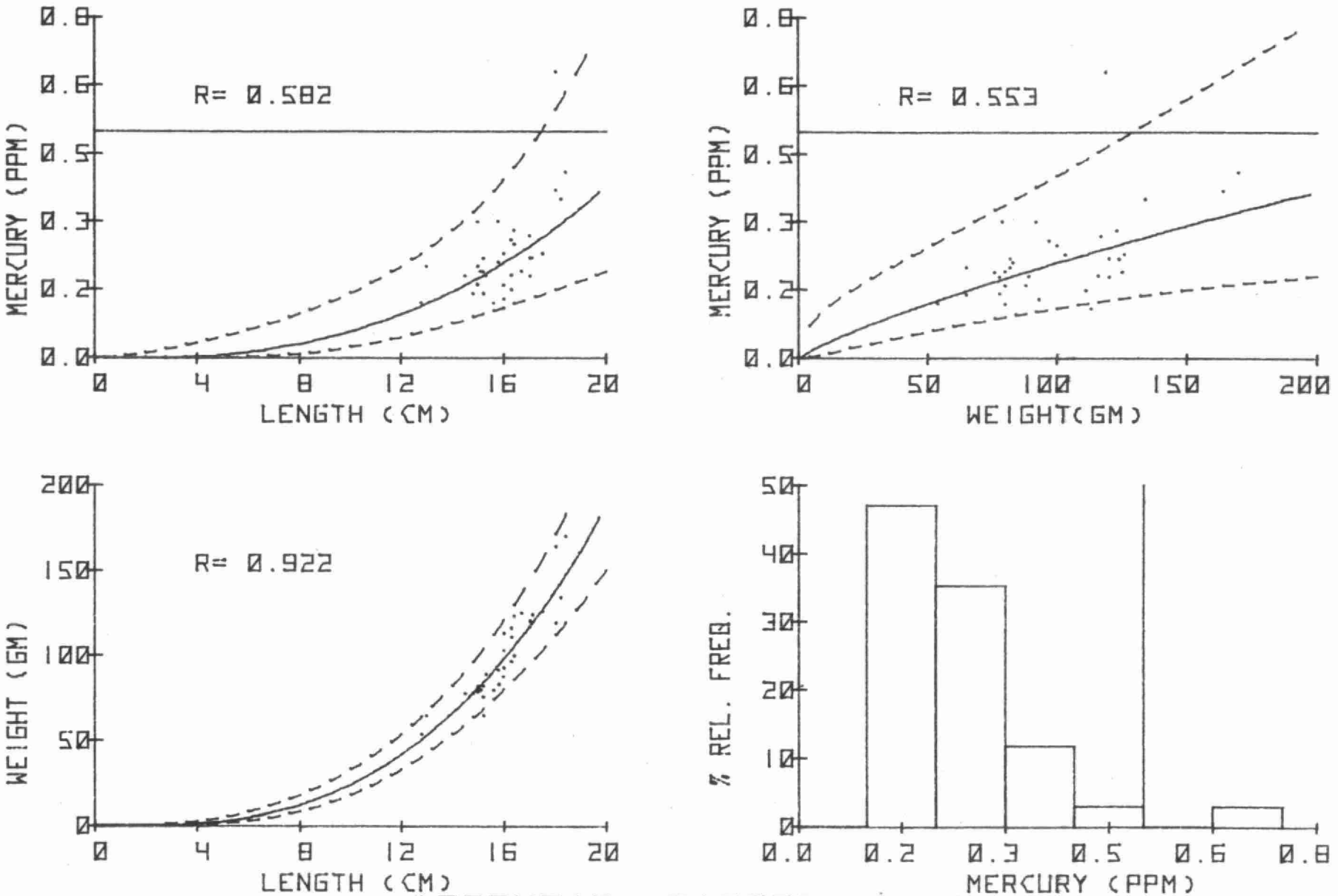

R= 0.582
MERCURY (PPM)
LENGTH (CM)
R= 0.553
MERCURY (PPM)
WEIGHT(GM)
R= 0.922
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
IROQUOIS: P'SEED, 1975

FIGURE B5(a)

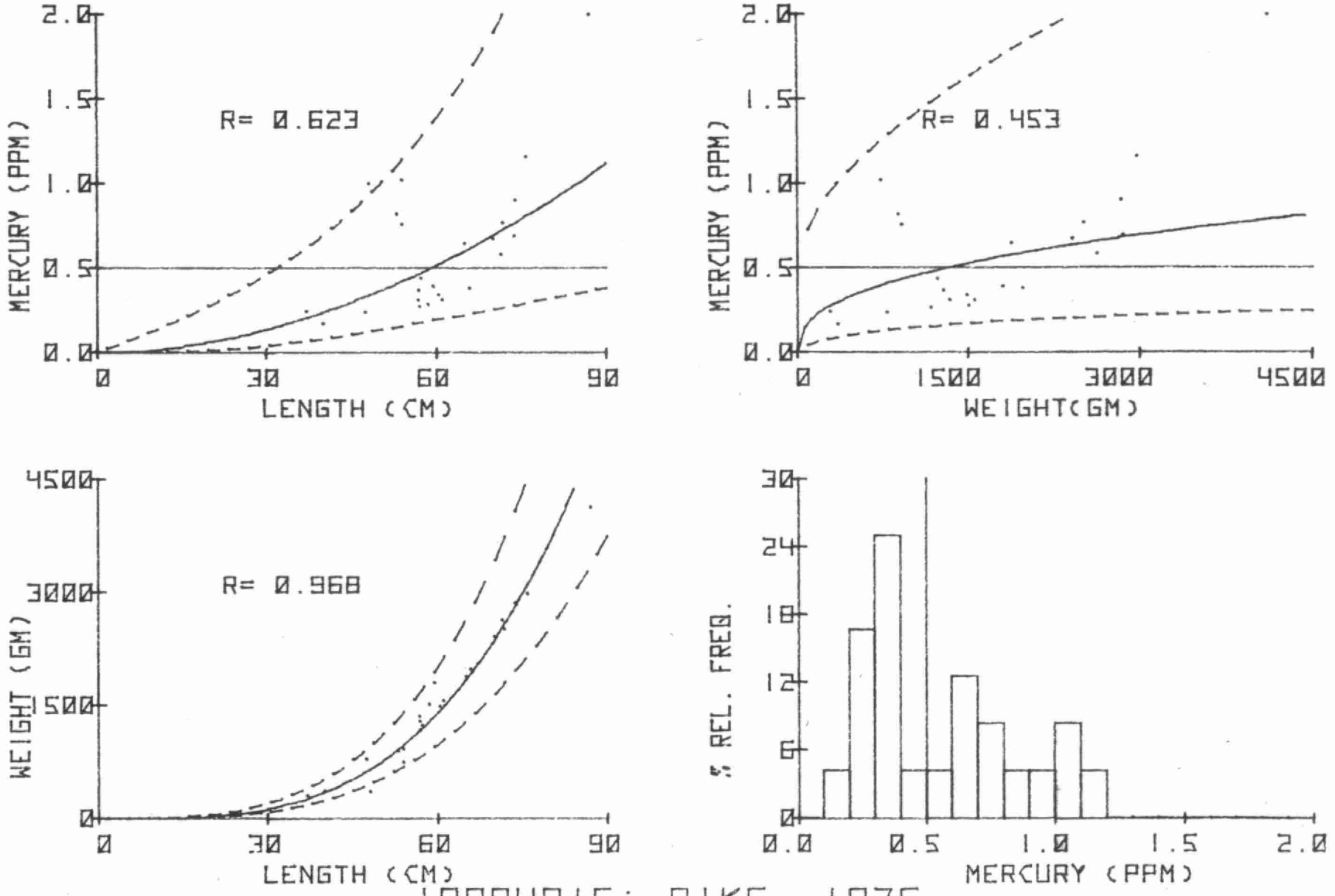

MERCURY (PPM)
2.0
1.5
1.0
0.5
0.0
R= 0.623
0
30
60
90
LENGTH (CM)
MERCURY (PPM)
R= 0.453
0
1500
3000
4500
WEIGHT(GM)
WEIGHT (GM)
R= 0.968
LENGTH (CM)
% REL. FREQ.
0.0
0.5
1.0
1.5
2.0
MERCURY (PPM)
IROQUOIS: PIKE, 1975

FIGURE B5(b)

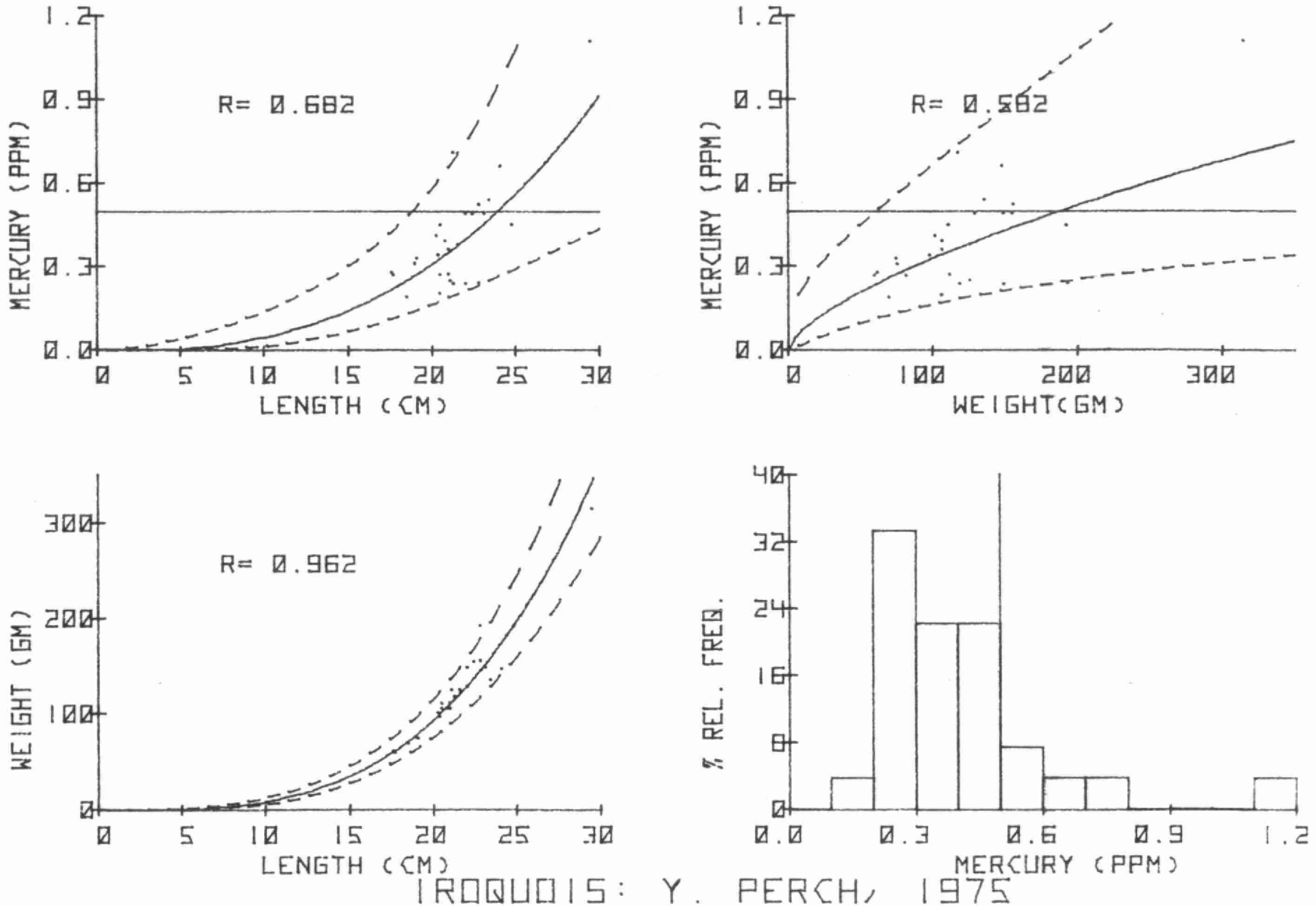

R= 0.682
MERCURY (PPM)
LENGTH (CM)
R= 0.582
MERCURY (PPM)
WEIGHT(GM)
R= 0.962
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
IROQUOIS: Y. PERCH, 1975

FIGURE B5(c)

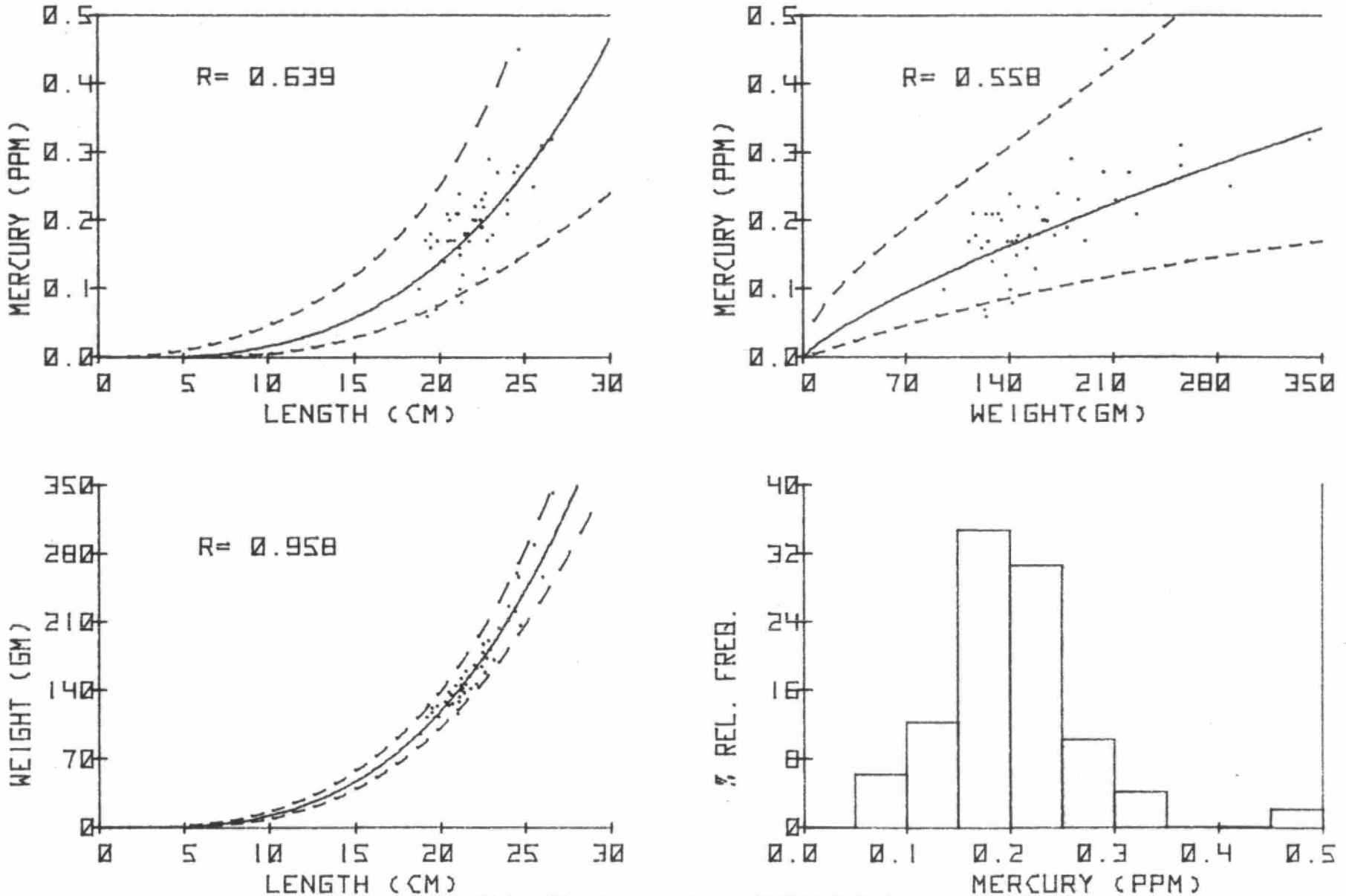

R= 0.639
MERCURY (PPM)
LENGTH (CM)
R= 0.558
MERCURY (PPM)
WEIGHT(GM)
R= 0.958
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
IROQUOIS: B. CRAPPIE, 1975

FIGURE B5(d)

TABLE B-6

MERCURY DATA SUMMARY
ONTARIO MINISTRY OF THE ENVIRONMENT, LABORATORY SERVICES BRANCH

LOCATION: LAKE ONTARIO #5, 1975
POOLED: BAINSVILLE, CHARLOTTENBURG, GLEN WALTER, AND SUMMERSTOWN

SPECIES	N	MERCURY CONC. MEAN	MERCURY CONC. RANGE	LENGTH (CM.) MEAN	LENGTH (CM.) RANGE	WEIGHT(GM.) MEAN	WEIGHT(GM.) RANGE
Y. PERCH *	199	0.33	0.13- 0.98	20.3	15.8- 26.9	115	48- 303
B.BULLHEAD*	197	0.19	0.02- 0.34	28.2	19.5- 37.0	351	100- 727
PIKE *	32	0.79	0.25- 2.42	57.5	30.0- 81.0	1281	379- 3430
P'SEED *	149	0.25	0.07- 0.50	16.9	12.7- 22.1	131	53- 298
B. CRAPPIE*	72	0.21	0.10- 0.74	20.1	15.0- 30.0	142	50- 500
L.M. BASS *	12	0.47	0.17- 0.91	29.6	20.5- 39.0	535	134- 1228

* SIZE SPECIFIC CLASSIFICATION AVAILABLE

MERCURY CONCENTRATION IN RELATION TO FISH LENGTH

	SIZE RANGE IN INCHES								
SPECIES	<6	6-8	8-10	10-12	12-14	14-18	18-22	22-26	26-30	>30
Y. PERCH	A	A	A	A	B	-	-	-	-	-
B.BULLHEAD	-	A	A	A	A	A	-	-	-	-
PIKE	-	-	-	A	A	A	B	B	C	C
P'SEED	A	A	A	-	-	-	-	-	-	-
B. CRAPPIE	A	A	A	A	A	-	-	-	-	-
L.M. BASS	-	A	A	A	B	B	-	-	-	-

A MERCURY CONCENTRATION <0.5 PPM
B MERCURY CONCENTRATION 0.5-1.0 PPM
C MERCURY CONCENTRATION 1.0-1.5 PPM
D MERCURY CONCENTRATION >1.5 PPM
- MERCURY DATA NOT AVAILABLE FOR THIS SIZE

*******REGRESSION DATA*******

REGRESSION MODEL: HG=A0*L↑A1

SPECIES	A0	A1	R	STD LEN.	HG AT STD.
Y. PERCH	0.017565	0.95925	0.315	0	0.00
B.BULLHEAD	0.005765	1.04035	0.422	0	0.00
PIKE	0.000707	1.69546	0.626	60	0.73
P'SEED	0.002266	1.64879	0.570	0	0.00
B. CRAPPIE	0.001701	1.59091	0.631	0	0.00
L.M. BASS	0.000729	1.88417	0.791	0	0.00

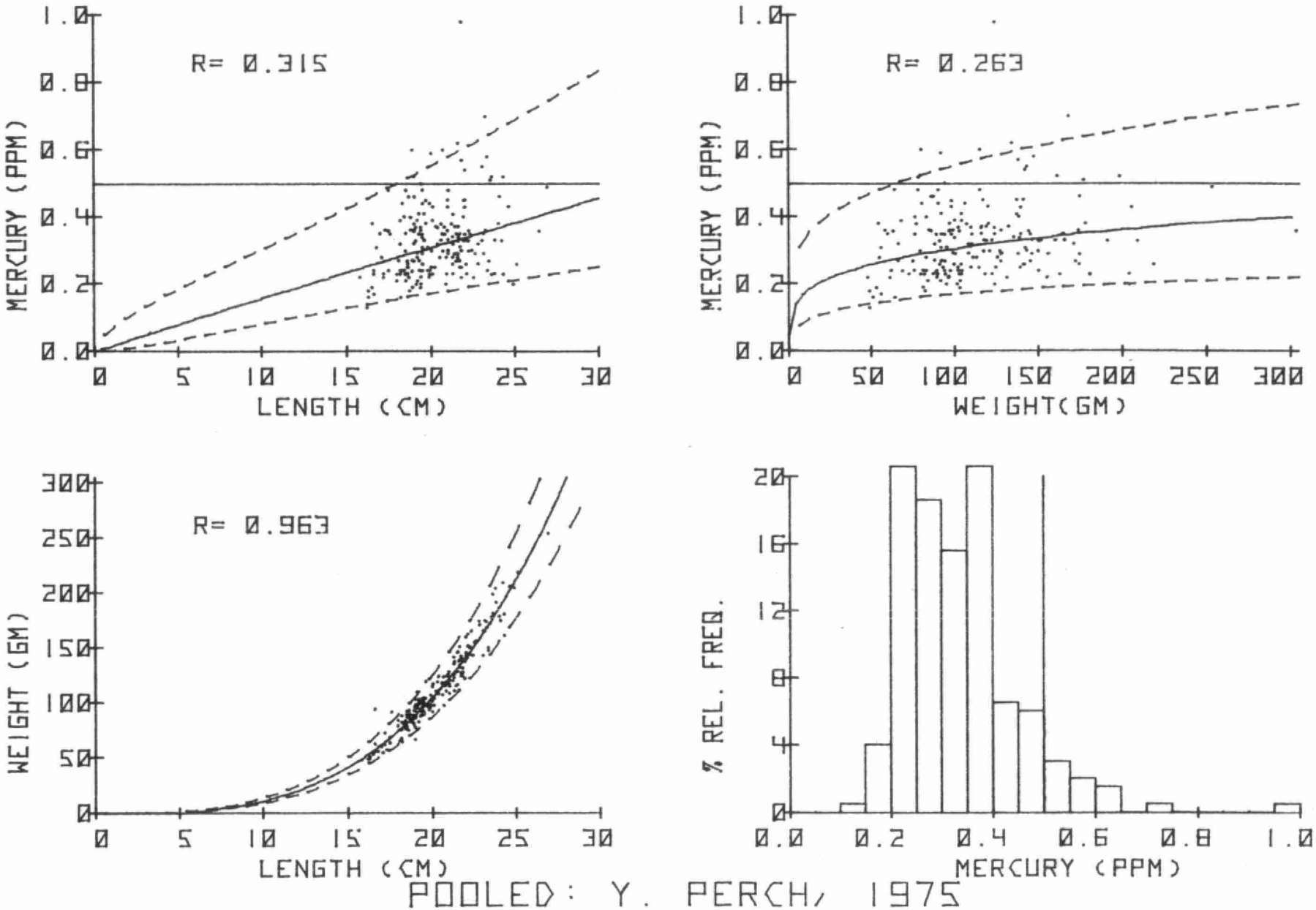

R= 0.315
MERCURY (PPM)
LENGTH (CM)
R= 0.263
MERCURY (PPM)
WEIGHT(GM)
R= 0.963
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
POOLED: Y. PERCH, 1975

FIGURE B6(a)

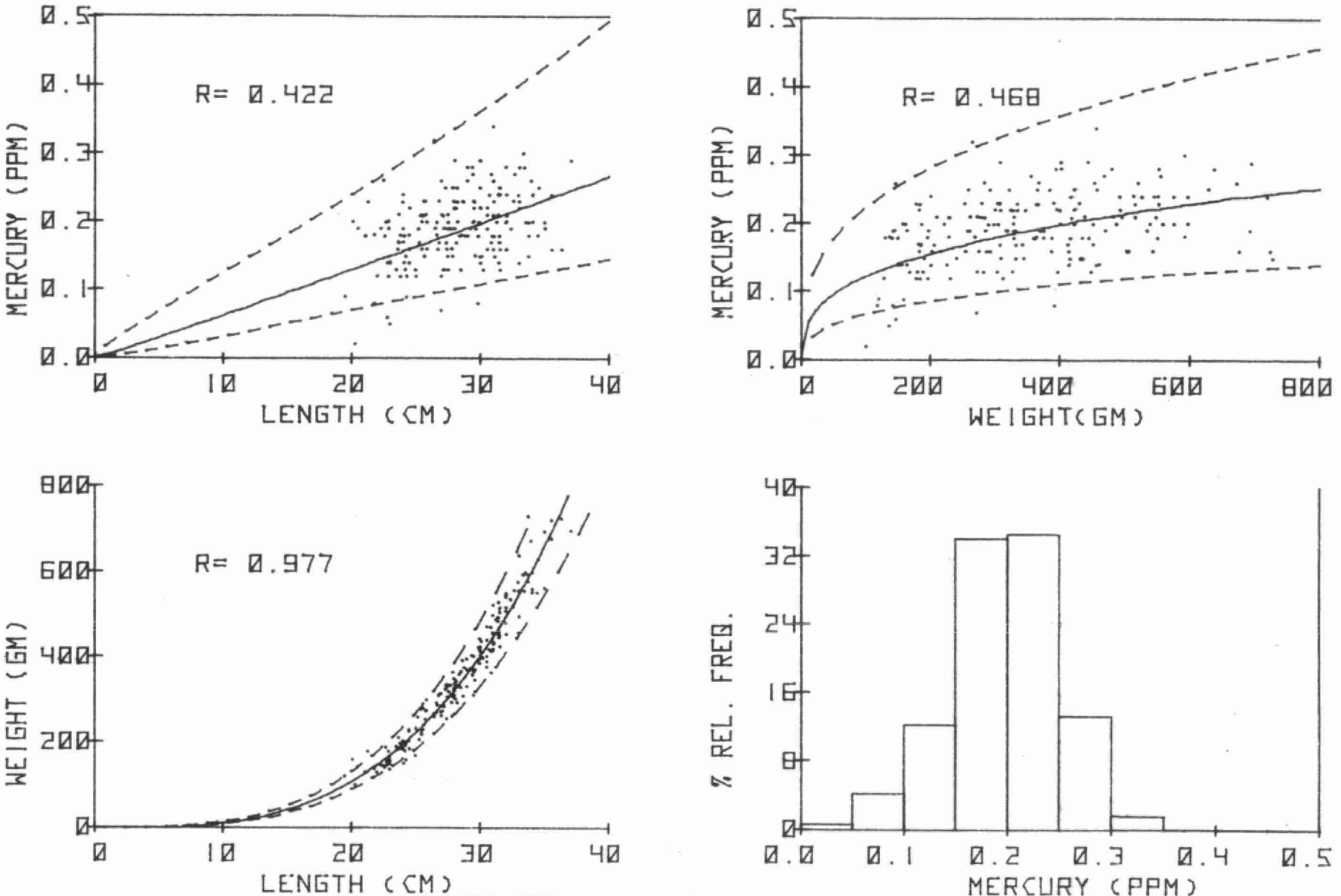

R= 0.422
MERCURY (PPM)
LENGTH (CM)
R= 0.468
MERCURY (PPM)
WEIGHT(GM)
R= 0.977
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
POOLED: B.BULLHEAD, 1975

FIGURE B6(b)

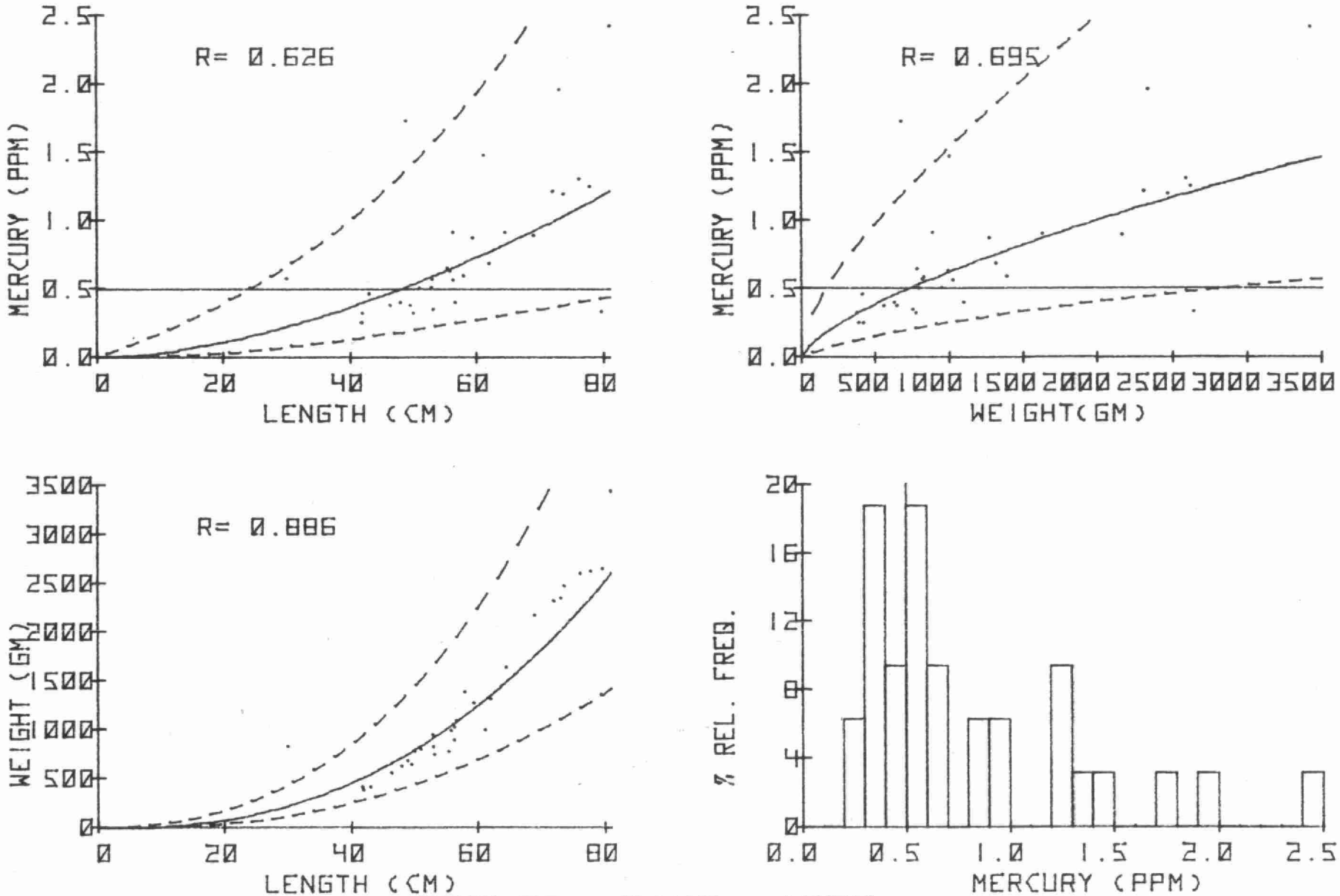

R= 0.626
MERCURY (PPM)
LENGTH (CM)
R= 0.695
MERCURY (PPM)
WEIGHT(GM)
R= 0.886
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
POOLED: PIKE, 1975

FIGURE B6(c)

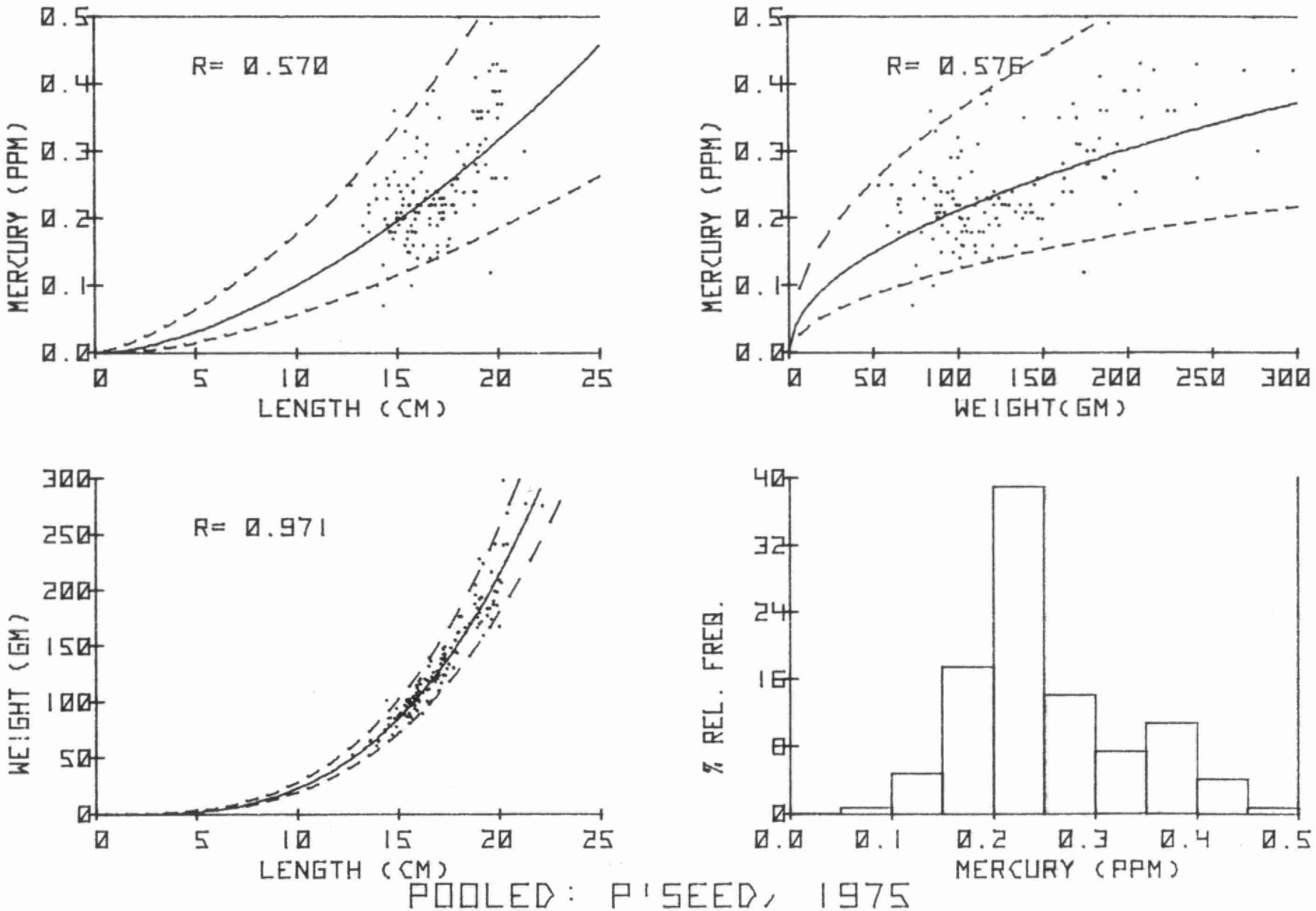

R= 0.570
MERCURY (PPM)
LENGTH (CM)
R= 0.576
MERCURY (PPM)
WEIGHT(GM)
R= 0.971
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
POOLED: PISEED, 1975

FIGURE B6(d)

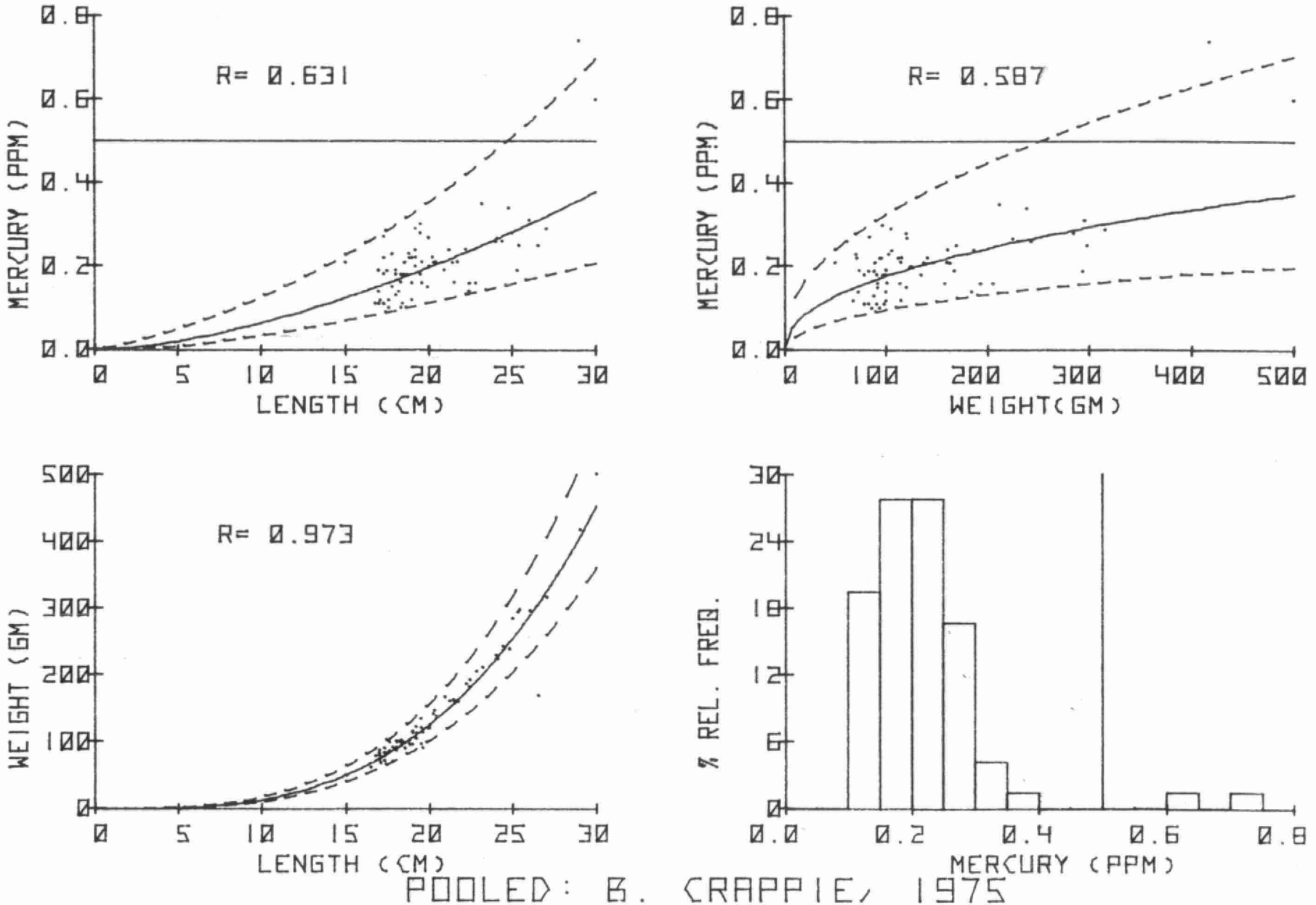

R= 0.631
MERCURY (PPM)
LENGTH (CM)
R= 0.587
MERCURY (PPM)
WEIGHT(GM)
R= 0.973
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
POOLED: B. CRAPPIE, 1975

FIGURE B6(e)

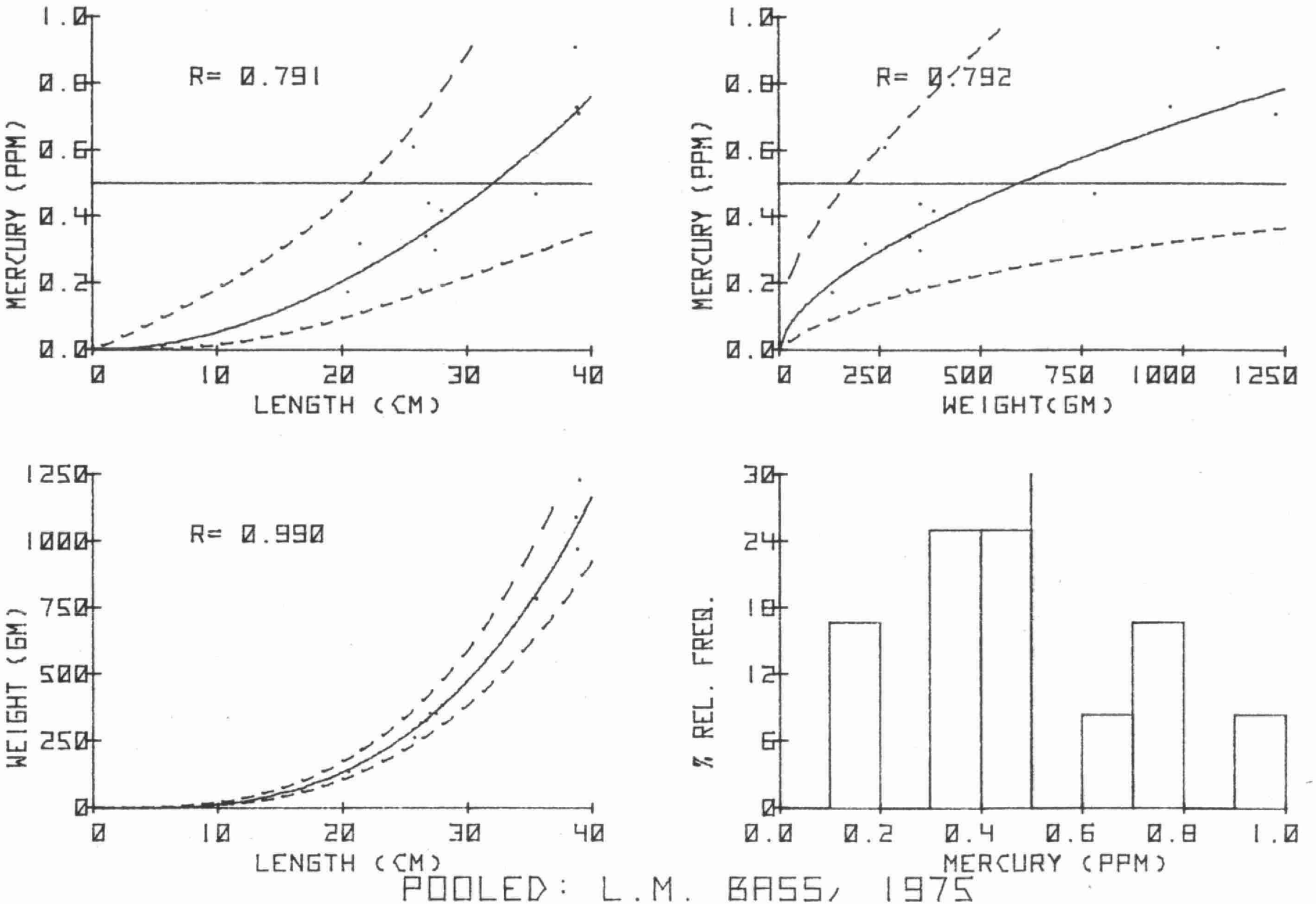

R= 0.791
MERCURY (PPM)
LENGTH (CM)
R= 0.792
MERCURY (PPM)
WEIGHT(GM)
R= 0.990
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
POOLED: L.M. BASS, 1975

FIGURE B6(f)

TABLE B-7

MERCURY DATA SUMMARY
ONTARIO MINISTRY OF THE ENVIRONMENT, LABORATORY SERVICES BRANCH

LOCATION: LAKE ONTARIO #7, 1975
L. ST. FRANCIS, GLENGARRY COUNTY
LAT/LONG: 4508/7430

SPECIES	N	MERCURY CONC. MEAN	MERCURY CONC. RANGE	LENGTH (CM.) MEAN	LENGTH (CM.) RANGE	WEIGHT(GM.) MEAN	WEIGHT(GM.) RANGE
W. SUCKER	15	0.51	0.20- 0.79	48.7	43.5- 57.0	1611	1033- 2862
PIKE	1	1.27	- -	75.0	- -	2861	- -
WALLEYE *	19	1.32	0.60- 3.40	54.7	44.0- 75.0	1892	803- 4072

* SIZE SPECIFIC CLASSIFICATION AVAILABLE

MERCURY CONCENTRATION IN RELATION TO FISH LENGTH

	SIZE RANGE IN INCHES									
SPECIES	<6	6-8	8-10	10-12	12-14	14-18	18-22	22-26	26-30	>30
WALLEYE	-	-	-	-	-	B	C	D	D	D

A MERCURY CONCENTRATION <0.5 PPM
B MERCURY CONCENTRATION 0.5-1.0 PPM
C MERCURY CONCENTRATION 1.0-1.5 PPM
D MERCURY CONCENTRATION >1.5 PPM
\- MERCURY DATA NOT AVAILABLE FOR THIS SIZE

*******REGRESSION DATA*******

REGRESSION MODEL: HG=A0*L↑A1

SPECIES	A0	A1	R	STD LEN.	HG AT STD.
WALLEYE	0.000010	2.93514	0.920	50	0.93

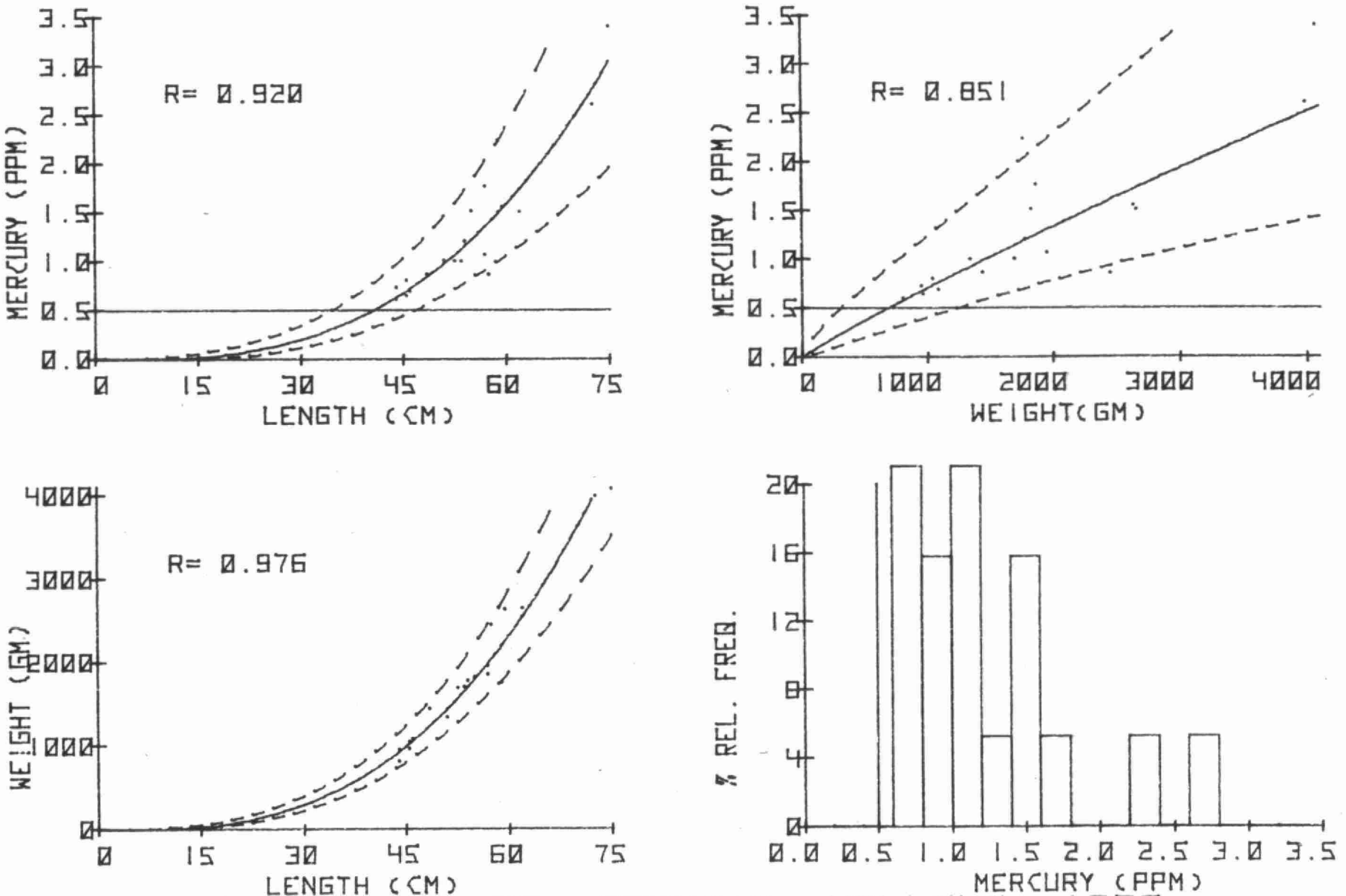

R= 0.920
MERCURY (PPM)
LENGTH (CM)
R= 0.851
MERCURY (PPM)
WEIGHT(GM)
R= 0.976
WEIGHT (GM)
LENGTH (CM)
% REL. FREQ.
MERCURY (PPM)
L. ST. FRANCIS: WALLEYE, 1976

FIGURE B7

APPENDIX C

MERCURY CONCENTRATIONS IN 1970 AND 1975 SEDIMENT SAMPLES AND 1975 FISH SAMPLES - RAW DATA.

INDEX

TABLE C-1. SEDIMENT ANALYSES - 1970

DISTANCE FROM FLY CREEK SEWER (mi.)[1]	DISTANCE OFF NORTH SHORE (ft.)[2]	MERCURY (ppm dry wt.)[3]	IGNITION LOSS (%)
3.20 (u)	9,800	0.06	1.3
3.00 (u)	9,000	0.29	7.7
0.80 (u)	250	0.24	2.5
0.35		1.25	-
0.45		0.85	-
0.60		14.50	-
0.70	100	7.46	22.0
		1.95	-
0.90		2.20	-
1.90	300	35.85	15.0
2.35	100	1.24	3.2
	400	12.03	9.5
2.50	150	23.89	16.4
	300	7.11	8.4
	450	20.31	15.0
	600	3.78	30.0
2.60	150	14.18	16.0
	500	4.67	12.0
2.65	150	7.86	10.0
	500	3.51	7.5
2.85	50	2.36	5.9
	450	6.57	13.0
	900	9.42	24.0
3.10	300	10.08	13.0
3.95	3,100	4.38	17.0
4.30	200	7.74	12.0
4.83	4,300	0.32	3.0
5.16	900	4.33	12.0
5.23	2,000	1.18	11.0
	3,200	0.79	11.0
5.30	5,200	0.27	8.6
5.55	50	4.00	-
	1,000	0.65	-
	3,000	0.70	-
	3,200	0.35	-
	3,300	0.30	-
	3,350	0.09	-
6.70	2,000	0.27	8.2
7.05	1,000	2.67	16.0
9.65	1,400	3.37	10.0
	1,900	1.24	4.8
	4,800	0.64	8.3
	6,100	0.24	5.4
	8,700	0.31	11.0
12.40	2,700	2.73	7.8
12.95	7,400	0.64	9.6
13.30	11,600	0.09	4.8

(u) - Upstream

1 1 mi. = 1.6 km

2 1 ft. = 0.305 m

3 ppm = mg/kg

TABLE C-2. SEDIMENT ANALYSES - 1975

DISTANCE FROM FLY CREEK SEWER (mi.)[1]	DISTANCE OFF NORTH SHORE (ft.)[2]	MERCURY (ppm dry wt.)[3]	IGNITION LOSS (%)
6.75 (u)	9,000	L 0.01	-
	10,000	L 0.01	-
6.65 (u)	500	0.02	-
6.50 (u)	300	0.07	-
	1,800	0.14	-
	3,000	0.12	-
6.00 (u)	12,500	0.02	-
	13,500	0.21	-
4.50 (u)	7,000	0.04	-
	7,500	0.03	-
	8,500	0.05	-
4.25 (u)	300	0.10	-
	600	0.10	-
	3,000	0.04	-
	3,400	0.06	-
4.05 (u)	550	0.02	-
	2,200	0.04	-
	6,300	0.05	-
	6,900	0.02	-
3.00 (u)	9,000	0.09	3.0
	9,800	0.02	1.2
1.87 (u)	50	0.02	L 1.0
0.20 (u)	700	0.03	1.3
	1,000	0.07	1.2
0.00	50	0.35	2.6
0.35	250	12.7	36.0
0.55	100	2.7	16.0
0.65	100	1.8	10.0
0.70	100	18.2	13.0
	250	11.0	27.0
	400	0.85	1.8
0.87	100	0.05	1.7
1.15	1,300	0.07	2.6
	1,700	0.25	8.8
1.45	100	2.09	11.0
1.70	100	0.37	2.1
2.20	1,000	0.04	1.7
	1,400	0.22	5.5
	1,800	0.18	5.5
2.37	50	29.0	6.5
2.46	50	7.3	4.4
	100	6.0	4.4
	300	0.62	1.9
2.47	50	7.2	13.0
	100	6.3	12.0
	300	4.8	10.0
2.49	50	32.0	13.0
	100	44.0	40.0
	250	11.3	9.7
	500	3.3	6.2

TABLE C-2 cont'd.

DISTANCE FROM FLY CREEK SEWER (mi.)	DISTANCE OFF NORTH SHORE (ft.)	MERCURY (ppm dry wt.)	IGNITION LOSS (%)
2.50	50	8.7	10.0
	150	6.9	6.8
	450	2.2	4.5
2.52	25	9.6	14.0
	100	5.3	11.0
	450	1.5	3.3
2.53	50	12.5	14.0
	150	4.8	8.2
	250	2.8	4.7
254	50	13.5	14.0
	250	7.0	8.0
2.55	25	7.8	14.0
2.56	50	5.0	8.2
2.58	50	8.2	8.0
2.60	50	5.3	6.9
2.85	50	1.99	8.9
	200	5.45	6.1
	450	20.0	11.0
	1,700	0.13	3.8
	2,000	0.47	11.0
3.07	50	2.84	12.0
	200	2.40	9.0
	350	4.86	6.8
	800	0.65	2.1
	1,300	0.28	2.8
3.20	50	2.40	11.0
	300	4.49	8.3
	800	16.1	13.0
3.40	1,300	0.74	2.6
	1,300	0.66	4.6
3.65	200	0.55	2.2
	4,000	0.34	8.3
3.82	50	0.47	4.0
	850	1.22	9.6
	2,900	0.39	1.8
4.05	100	1.78	9.1
	900	0.74	9.8
4.30	200	0.20	2.7
	1,000	1.46	8.5
	1,700	1.78	5.7
4.65	650	6.3	8.7
	1,050	2.15	9.0
	2,500	0.31	4.0
4.80	500	1.00	4.6
	1,400	0.28	1.6
	3,800	0.25	2.3
5.10	200	1.03	6.9
	400	5.5	7.7
5.30	2,800	0.27	3.9
	3,200	0.62	9.0
	9,750	0.14	-
	10,500	0.20	-

TABLE C-2 cont'd.

DISTANCE FROM FLY CREEK SEWER (mi.)	DISTANCE OFF NORTH SHORE (ft.)	MERCURY (ppm dry wt.)	IGNITION LOSS
5.60	400	2.11	7.7
	3,000	0.07	2.1
	3,300	0.26	8.6
5.55	160	5.87	-
	410	3.65	-
	820	0.91	-
	1,070	2.02	-
	1,400	2.14	-
	1,800	0.02	-
	2,130	0.22	-
	2,790	0.20	-
	3,120	0.20	-
5.90	300	1.85	9.4
	500	1.54	7.6
6.10	300	3.65	8.3
	550	1.52	5.9
	2,300	0.06	2.7
6.70	2,400	0.11	3.5
6.95	1,100	1.10	7.6
7.12	100	4.58	-
	300	0.41	-
	600	0.92	-
	1,000	0.92	-
	1,300	0.39	-
	1,700	0.05	-
	4,200	0.01	-
	4,600	0.12	-
8.70	2,600	0.05	-
9.65	1,400	0.10	-
	1,900	0.10	-
	4,800	0.64	-
	6,100	0.01	-
	8,700	0.01	-
10.35	2,700	0.01	-
12.00	3,700	0.04	-
12.40	2,700	0.24	-
12.95	7,400	0.04	-
13.30	11,600	0.01	-
14.00	5,100	0.04	-

(u) - Upstream

L = less than

1 1 mi. = 1.6 km

2 1 ft. = 0.305 m

3 ppm = mg/kg

TABLE C-3

****** RAW DATA LIST ******

DRIVE: 1 FILE: 31
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: BAINSVILLE DISTRICT: GLENGARRY
LAT/LONG: 4511/7425 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	76		PIKE	62.0	1314	0.69
2	77		PIKE	48.0	631	0.40
3	78		PIKE	50.0	773	0.32
4	79		B. CRAPPIE	17.6	86	0.10
5	80		B. CRAPPIE	17.3	79	0.18
6	81		B. CRAPPIE	16.5	62	0.26
7	82		B. CRAPPIE	18.5	89	0.21
8	83		B. CRAPPIE	22.8	205	0.16
9	84		B. CRAPPIE	17.5	83	0.19
10	85		B. CRAPPIE	18.0	88	0.13
11	86		B. CRAPPIE	18.3	101	0.16
12	87		B. CRAPPIE	27.0	316	0.29
13	88		B. CRAPPIE	19.2	124	0.20
14	89		B. CRAPPIE	17.8	92	0.15
15	90		B. CRAPPIE	26.5	169	0.25
16	91		B. CRAPPIE	22.4	184	0.14
17	92		B. CRAPPIE	19.6	115	0.21
18	93		B. CRAPPIE	17.0	74	0.19
19	94		B. CRAPPIE	18.4	98	0.11
20	95		B. CRAPPIE	25.3	294	0.19
21	96		B. CRAPPIE	25.4	298	0.25
22	97		B. CRAPPIE	19.2	106	0.24
23	98		B. CRAPPIE	17.0	73	0.14
24	99		B. CRAPPIE	29.0	418	0.74
25	100		B. CRAPPIE	19.6	92	0.16
26	101		B. CRAPPIE	19.9	120	0.15
27	102		B. CRAPPIE	24.0	230	0.26
28	103		B. CRAPPIE	18.8	103	0.23
29	104		B. CRAPPIE	20.0	125	0.20
30	105		B. CRAPPIE	19.0	116	0.22
31	106		B. CRAPPIE	24.1	225	0.27
32	107		B. CRAPPIE	18.2	100	0.14
33	108		B. CRAPPIE	18.3	94	0.10
34	109		B. CRAPPIE	17.0	83	0.11
35	110		B. CRAPPIE	17.0	79	0.11
36	111		B. CRAPPIE	18.0	91	0.18
37	112		B. CRAPPIE	16.8	79	0.11
38	125		PIKE	79.6	2639	0.34
39	126		PIKE	49.0	679	1.73
40	127		PIKE	76.1	2590	1.31
41	128		PIKE	53.2	751	0.35
42	129		PIKE	58.0	1385	0.59
43	130		PIKE	42.0	379	0.32
44	131		PIKE	56.3	1022	0.56
45	132		PIKE	49.6	646	0.38
46	133		PIKE	51.0	793	0.50
47	223		P'SEED	16.8	119	0.39
48	224		P'SEED	19.0	170	0.35
49	225		P'SEED	17.9	144	0.21
50	226		P'SEED	17.4	130	0.22

TABLE C-3 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 32
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: BAINSVILLE DISTRICT: GLENGARRY
LAT/LONG: 4511/7425 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	227		P'SEED	16.5	112	0.31
2	228		P'SEED	16.3	120	0.16
3	229		P'SEED	15.8	97	0.24
4	230		P'SEED	15.0	88	0.20
5	231		P'SEED	17.9	162	0.24
6	232		P'SEED	19.9	186	0.26
7	233		P'SEED	19.4	177	0.28
8	234		P'SEED	19.2	160	0.35
9	235		P'SEED	15.8	94	0.24
10	236		P'SEED	16.0	100	0.32
11	237		P'SEED	18.9	184	0.41
12	238		P'SEED	17.3	143	0.21
13	239		P'SEED	15.3	90	0.22
14	240		P'SEED	16.0	101	0.22
15	241		P'SEED	14.0	65	0.23
16	242		P'SEED	19.5	184	0.36
17	243		P'SEED	14.9	84	0.36
18	244		P'SEED	19.9	198	0.39
19	245		P'SEED	16.2	90	0.22
20	246		P'SEED	17.2	138	0.20
21	247		P'SEED	15.4	96	0.29
22	248		P'SEED	14.4	102	0.20
23	249		P'SEED	14.5	80	0.19
24	250		P'SEED	17.2	124	0.23
25	251		P'SEED	14.7	71	0.18
26	252		P'SEED	14.0	65	0.10
27	253		P'SEED	19.1	194	0.31
28	254		P'SEED	15.1	74	0.25
29	255		P'SEED	15.9	92	0.21
30	256		P'SEED	15.2	90	0.24
31	257		P'SEED	15.5	90	0.15
32	258		P'SEED	14.3	73	0.07
33	259		P'SEED	16.6	101	0.14
34	260		P'SEED	18.5	170	0.31
35	261		P'SEED	15.7	85	0.10
36	262		P'SEED	15.4	101	0.20
37	263		P'SEED	14.9	94	0.18
38	264		P'SEED	13.9	61	0.25
39	265		P'SEED	14.6	78	0.18
40	266		P'SEED	17.0	110	0.15
41	267		P'SEED	18.9	176	0.28
42	268		P'SEED	15.6	87	0.22
43	269		P'SEED	15.2	89	0.21
44	270		P'SEED	15.4	87	0.33
45	271		P'SEED	14.8	85	0.17
46	272		P'SEED	14.3	75	0.13
47	306		L.M. BASS	20.5	134	0.17
48	307		L.M. BASS	26.7	326	0.34
49	308		L.M. BASS	27.5	352	0.30
50	309		L.M. BASS	39.0	1228	0.71

TABLE C-3 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 33
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: BAINSVILLE DISTRICT: GLENGARRY
LAT/LONG: 4511/7425 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	458		B. CRAPPIE	20.9	167	0.19
2	459		B. CRAPPIE	24.4	243	0.26
3	460		B. CRAPPIE	19.0	115	0.12
4	461		B. CRAPPIE	18.5	98	0.18
5	462		B. CRAPPIE	20.2	141	0.22
6	463		B. CRAPPIE	20.3	147	0.21
7	464		B. CRAPPIE	22.4	193	0.16
8	465		B. CRAPPIE	22.2	187	0.24
9	466		B. CRAPPIE	19.5	135	0.18
10	467		B. CRAPPIE	17.3	91	0.11
11	468		B. CRAPPIE	19.2	112	0.22
12	469		B. CRAPPIE	17.6	100	0.12
13	470		B. CRAPPIE	18.0	100	0.19
14	580		B.BULLHEAD	27.8	259	0.25
15	581		B.BULLHEAD	25.3	206	0.17
16	582		B.BULLHEAD	31.5	422	0.25
17	583		B.BULLHEAD	25.4	230	0.21
18	584		B.BULLHEAD	29.5	364	0.23
19	585		B.BULLHEAD	28.5	328	0.13
20	586		B.BULLHEAD	23.0	150	0.14
21	587		B.BULLHEAD	27.0	261	0.21
22	588		B.BULLHEAD	21.8	118	0.08
23	589		B.BULLHEAD	29.2	371	0.19
24	590		B.BULLHEAD	29.8	388	0.18
25	591		B.BULLHEAD	29.5	401	0.20
26	592		B.BULLHEAD	22.8	147	0.06
27	593		B.BULLHEAD	27.9	304	0.23
28	594		B.BULLHEAD	28.2	293	0.25
29	595		B.BULLHEAD	25.6	229	0.21
30	596		B.BULLHEAD	23.0	136	0.05
31	597		B.BULLHEAD	29.4	356	0.27
32	598		B.BULLHEAD	24.3	159	0.09
33	599		B.BULLHEAD	24.5	182	0.22
34	600		B.BULLHEAD	22.6	141	0.18
35	601		B.BULLHEAD	27.4	254	0.16
36	602		B.BULLHEAD	30.0	402	0.29
37	603		B.BULLHEAD	22.8	154	0.14
38	604		B.BULLHEAD	23.0	155	0.14
39	605		B.BULLHEAD	20.3	100	0.02
40	606		B.BULLHEAD	24.0	185	0.17
41	607		B.BULLHEAD	30.5	387	0.16
42	608		B.BULLHEAD	29.6	345	0.15
43	609		B.BULLHEAD	27.2	286	0.19
44	610		B.BULLHEAD	30.5	400	0.22
45	611		B.BULLHEAD	27.0	272	0.07
46	612		B.BULLHEAD	27.3	322	0.25
47	613		B.BULLHEAD	28.0	335	0.22
48	614		B.BULLHEAD	22.5	146	0.26
49	615		B.BULLHEAD	28.0	327	0.22
50	616		B.BULLHEAD	25.5	222	0.20

TABLE C-3 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 34
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: BAINSVILLE DISTRICT: GLENGARRY
LAT/LONG: 4511/7425 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	617		B.BULLHEAD	27.5	303	0.13
2	618		B.BULLHEAD	28.2	329	0.20
3	619		B.BULLHEAD	29.6	370	0.19
4	620		B.BULLHEAD	28.1	301	0.22
5	621		B.BULLHEAD	27.0	284	0.26
6	622		B.BULLHEAD	29.8	392	0.08
7	623		B.BULLHEAD	28.0	325	0.22
8	624		B.BULLHEAD	24.0	184	0.23
9	625		B.BULLHEAD	27.8	309	0.15
10	626		B.BULLHEAD	28.0	309	0.29
11	627		B.BULLHEAD	28.7	308	0.23
12	628		B.BULLHEAD	22.8	161	0.20
13	795		Y. PERCH	18.5	78	0.48
14	796		Y. PERCH	21.8	124	0.98
15	797		Y. PERCH	19.0	86	0.36
16	798		Y. PERCH	18.9	80	0.60
17	799		Y. PERCH	21.3	110	0.32
18	800		Y. PERCH	16.3	51	0.16
19	801		Y. PERCH	23.4	172	0.27
20	802		Y. PERCH	20.9	124	0.20
21	803		Y. PERCH	21.5	116	0.35
22	804		Y. PERCH	18.6	75	0.27
23	805		Y. PERCH	19.4	94	0.50
24	806		Y. PERCH	20.7	98	0.35
25	807		Y. PERCH	19.3	92	0.41
26	808		Y. PERCH	18.2	82	0.23
27	809		Y. PERCH	21.0	108	0.29
28	810		Y. PERCH	19.6	104	0.41
29	811		Y. PERCH	21.8	139	0.25
30	812		Y. PERCH	20.1	104	0.23
31	813		Y. PERCH	21.5	128	0.29
32	814		Y. PERCH	21.6	111	0.28
33	815		Y. PERCH	21.3	122	0.23
34	816		Y. PERCH	20.3	119	0.37
35	817		Y. PERCH	20.0	92	0.59
36	818		Y. PERCH	19.7	98	0.45
37	819		Y. PERCH	16.2	49	0.13
38	820		Y. PERCH	16.5	54	0.38
39	821		Y. PERCH	20.8	110	0.35
40	822		Y. PERCH	17.5	64	0.48
41	823		Y. PERCH	18.2	64	0.16
42	824		Y. PERCH	16.6	56	0.17
43	825		Y. PERCH	20.7	115	0.60
44	826		Y. PERCH	17.1	55	0.28
45	827		Y. PERCH	19.5	90	0.44
46	828		Y. PERCH	18.2	68	0.39
47	829		Y. PERCH	19.0	87	0.46
48	830		Y. PERCH	20.6	107	0.38
49	831		Y. PERCH	24.3	161	0.52
50	832		Y. PERCH	19.2	83	0.28

TABLE C-3 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 35
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: BAINSVILLE DISTRICT: GLENGARRY
LAT/LONG: 4511/7425 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	833		Y. PERCH	19.5	90	0.48
2	834		Y. PERCH	19.4	102	0.37
3	835		Y. PERCH	23.3	150	0.24
4	836		Y. PERCH	21.0	117	0.45
5	837		Y. PERCH	21.0	115	0.48
6	838		Y. PERCH	19.5	100	0.34
7	839		Y. PERCH	17.0	60	0.35
8	840		Y. PERCH	16.5	53	0.19
9	841		Y. PERCH	23.3	147	0.58
10	842		Y. PERCH	19.1	91	0.33
11	843		Y. PERCH	18.5	76	0.35
12	844		Y. PERCH	17.5	63	0.36
13	845		Y. PERCH	15.8	48	0.22
14	846		Y. PERCH	18.3	80	0.44
15	847		Y. PERCH	16.8	56	0.31
16	848		Y. PERCH	18.4	76	0.40
17	849		Y. PERCH	16.3	49	0.18
18	850		Y. PERCH	17.3	58	0.36

TABLE C-4

****** RAW DATA LIST ******

DRIVE: 1 FILE: 27
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: CHARLOTTENBURG DISTRICT: GLENGARRY
LAT/LONG: 4510/7438 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	4		L.M. BASS	27.0	352	0.44
2	5		L.M. BASS	38.7	1088	0.91
3	6		L.M. BASS	21.5	216	0.32
4	7		L.M. BASS	38.8	970	0.73
5	8		L.M. BASS	28.0	386	0.42
6	9		L.M. BASS	25.8	265	0.61
7	10		L.M. BASS	35.5	783	0.47
8	11		L.M. BASS	26.3	320	0.18
9	53		B. CRAPPIE	30.0	500	0.60
10	54		B. CRAPPIE	23.2	212	0.35
11	55		B. CRAPPIE	24.8	239	0.34
12	56		B. CRAPPIE	20.0	121	0.27
13	57		B. CRAPPIE	19.5	120	0.28
14	58		B. CRAPPIE	19.5	97	0.30
15	59		B. CRAPPIE	15.0	50	0.21
16	60		B. CRAPPIE	18.3	97	0.18
17	61		B. CRAPPIE	20.4	137	0.21
18	62		B. CRAPPIE	18.7	100	0.18
19	63		B. CRAPPIE	21.4	163	0.21
20	64		B. CRAPPIE	19.0	114	0.16
21	65		B. CRAPPIE	25.0	285	0.28
22	66		B. CRAPPIE	17.3	72	0.22
23	67		B. CRAPPIE	18.8	94	0.22
24	68		B. CRAPPIE	17.8	71	0.23
25	69		B. CRAPPIE	17.1	68	0.12
26	70		B. CRAPPIE	21.7	160	0.21
27	71		B. CRAPPIE	21.2	161	0.24
28	72		B. CRAPPIE	19.0	96	0.22
29	73		B. CRAPPIE	17.3	84	0.27
30	74		B. CRAPPIE	17.0	88	0.19
31	75		B. CRAPPIE	19.2	105	0.29
32	210		PIKE	72.0	2313	1.22
33	211		PIKE	81.0	3430	2.42
34	212		PIKE	53.0	948	0.51
35	213		PIKE	30.0	829	0.58
36	214		PIKE	43.0	413	0.46
37	287		PIKE	41.8	417	0.25
38	288		PIKE	59.4	1270	0.87
39	289		PIKE	55.9	992	0.63
40	290		PIKE	61.2	1001	1.47
41	291		PIKE	46.4	559	0.38
42	292		PIKE	41.9	390	0.25
43	293		PIKE	53.0	815	0.57
44	294		PIKE	77.7	2621	1.25
45	295		PIKE	55.5	782	0.65
46	296		PIKE	56.3	886	0.91
47	410		Y. PERCH	22.0	142	0.54
48	411		Y. PERCH	20.4	108	0.32
49	412		Y. PERCH	21.6	134	0.62
50	413		Y. PERCH	19.5	89	0.35

TABLE C-4 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 28
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: CHARLOTTENBURG DISTRICT: GLENGARRY
LAT/LONG: 4510/7438 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	414		Y. PERCH	18.6	91	0.26
2	415		Y. PERCH	19.4	99	0.36
3	416		Y. PERCH	17.6	92	0.35
4	417		Y. PERCH	19.5	99	0.26
5	418		Y. PERCH	19.6	119	0.33
6	419		Y. PERCH	22.2	144	0.36
7	420		Y. PERCH	19.2	99	0.29
8	421		Y. PERCH	21.6	139	0.34
9	422		Y. PERCH	16.6	95	0.23
10	423		Y. PERCH	21.4	116	0.37
11	424		Y. PERCH	21.5	145	0.27
12	425		Y. PERCH	21.0	120	0.43
13	426		Y. PERCH	23.2	168	0.70
14	427		Y. PERCH	20.4	124	0.37
15	428		Y. PERCH	20.0	102	0.25
16	429		Y. PERCH	19.2	100	0.39
17	430		Y. PERCH	20.0	117	0.30
18	431		Y. PERCH	21.5	146	0.29
19	432		Y. PERCH	20.7	124	0.35
20	433		Y. PERCH	20.1	98	0.43
21	434		Y. PERCH	20.5	113	0.28
22	435		Y. PERCH	21.0	146	0.33
23	436		Y. PERCH	19.3	94	0.35
24	437		Y. PERCH	21.8	131	0.22
25	438		Y. PERCH	22.4	143	0.30
26	439		Y. PERCH	21.6	138	0.29
27	440		Y. PERCH	18.7	86	0.46
28	441		Y. PERCH	21.3	137	0.41
29	442		Y. PERCH	22.5	155	0.22
30	443		Y. PERCH	18.9	89	0.24
31	444		Y. PERCH	18.6	93	0.25
32	445		Y. PERCH	20.9	118	0.23
33	446		Y. PERCH	23.0	143	0.55
34	447		Y. PERCH	19.1	110	0.37
35	448		Y. PERCH	21.8	138	0.57
36	449		Y. PERCH	19.0	92	0.27
37	450		Y. PERCH	18.3	81	0.24
38	451		Y. PERCH	21.7	142	0.31
39	452		Y. PERCH	18.2	88	0.32
40	453		Y. PERCH	16.6	62	0.24
41	454		Y. PERCH	19.1	95	0.20
42	455		Y. PERCH	19.9	106	0.44
43	456		Y. PERCH	19.5	92	0.31
44	457		Y. PERCH	18.0	84	0.21
45	629		B.BULLHEAD	30.5	470	0.19
46	630		B.BULLHEAD	24.0	197	0.19
47	631		B.BULLHEAD	27.2	282	0.13
48	632		B.BULLHEAD	25.5	217	0.16
49	633		B.BULLHEAD	22.3	145	0.19
50	634		B.BULLHEAD	26.6	290	0.20

TABLE C-4 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 29
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: CHARLOTTENBURG DISTRICT: GLENGARRY
LAT/LONG: 4510/7438 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	635		B.BULLHEAD	24.5	203	0.16
2	636		B.BULLHEAD	32.5	516	0.23
3	637		B.BULLHEAD	25.0	168	0.13
4	638		B.BULLHEAD	24.3	196	0.12
5	639		B.BULLHEAD	25.0	231	0.12
6	640		B.BULLHEAD	28.5	364	0.18
7	641		B.BULLHEAD	30.8	469	0.27
8	642		B.BULLHEAD	28.0	348	0.22
9	643		B.BULLHEAD	22.9	178	0.12
10	644		B.BULLHEAD	24.0	200	0.24
11	645		B.BULLHEAD	27.5	305	0.20
12	646		B.BULLHEAD	23.5	189	0.13
13	647		B.BULLHEAD	21.8	137	0.18
14	648		B.BULLHEAD	26.4	265	0.32
15	649		B.BULLHEAD	33.4	553	0.28
16	650		B.BULLHEAD	27.4	333	0.17
17	651		B.BULLHEAD	30.5	438	0.21
18	652		B.BULLHEAD	22.7	187	0.20
19	653		B.BULLHEAD	27.1	284	0.21
20	654		B.BULLHEAD	26.8	308	0.23
21	655		B.BULLHEAD	30.2	397	0.13
22	656		B.BULLHEAD	22.9	162	0.20
23	657		B.BULLHEAD	28.1	342	0.17
24	658		B.BULLHEAD	24.5	226	0.14
25	659		B.BULLHEAD	31.4	461	0.14
26	660		B.BULLHEAD	24.2	180	0.13
27	661		B.BULLHEAD	30.0	422	0.22
28	662		B.BULLHEAD	29.5	309	0.22
29	663		B.BULLHEAD	35.5	719	0.24
30	664		B.BULLHEAD	30.7	417	0.24
31	665		B.BULLHEAD	21.1	130	0.18
32	666		B.BULLHEAD	31.5	448	0.13
33	667		B.BULLHEAD	27.8	293	0.16
34	668		B.BULLHEAD	25.7	241	0.15
35	669		B.BULLHEAD	24.5	229	0.18
36	670		B.BULLHEAD	23.6	183	0.16
37	671		B.BULLHEAD	22.9	164	0.19
38	672		B.BULLHEAD	24.2	190	0.15
39	673		B.BULLHEAD	26.6	269	0.18
40	674		B.BULLHEAD	30.8	412	0.17
41	675		B.BULLHEAD	32.6	555	0.27
42	676		B.BULLHEAD	30.1	435	0.15
43	677		B.BULLHEAD	21.8	142	0.08
44	678		B.BULLHEAD	23.6	181	0.17
45	729		P'SEED	16.4	100	0.29
46	730		P'SEED	14.9	78	0.27
47	731		P'SEED	15.8	101	0.26
48	732		P'SEED	17.2	147	0.20
49	733		P'SEED	17.0	124	0.14
50	734		P'SEED	17.7	145	0.25

TABLE C-4 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 30
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: CHARLOTTENBURG DISTRICT: GLENGARRY
LAT/LONG: 4510/7438 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	735		P'SEED	17.0	110	0.16
2	736		P'SEED	15.4	102	0.16
3	737		P'SEED	15.7	105	0.18
4	738		P'SEED	15.5	99	0.17
5	739		P'SEED	16.9	121	0.24
6	740		P'SEED	16.0	102	0.30
7	741		P'SEED	16.2	108	0.27
8	742		P'SEED	17.1	139	0.35
9	743		P'SEED	15.9	106	0.20
10	744		P'SEED	15.6	99	0.22
11	745		P'SEED	16.8	118	0.23
12	746		P'SEED	16.5	132	0.24
13	747		P'SEED	15.5	87	0.25
14	748		P'SEED	16.4	119	0.23
15	749		P'SEED	17.7	130	0.22
16	750		P'SEED	19.0	180	0.30
17	751		P'SEED	16.9	128	0.22
18	752		P'SEED	15.3	89	0.20
19	753		P'SEED	17.1	117	0.23
20	754		P'SEED	16.4	111	0.23
21	755		P'SEED	19.7	187	0.26
22	756		P'SEED	17.1	134	0.21
23	757		P'SEED	15.1	88	0.20
24	758		P'SEED	20.4	241	0.26
25	759		P'SEED	17.0	127	0.24
26	760		P'SEED	16.7	126	0.22
27	761		P'SEED	18.9	167	0.24
28	762		P'SEED	14.5	80	0.23
29	763		P'SEED	19.6	216	0.42
30	764		P'SEED	17.3	140	0.21
31	765		P'SEED	16.0	110	0.22
32	766		P'SEED	16.0	118	0.14
33	767		P'SEED	17.3	124	0.23
34	768		P'SEED	15.8	103	0.16
35	769		P'SEED	16.4	119	0.23
36	770		P'SEED	18.3	162	0.28
37	771		P'SEED	15.9	108	0.18
38	772		P'SEED	16.6	118	0.19
39	773		P'SEED	22.1	275	0.50
40	774		P'SEED	17.0	124	0.19
41	775		P'SEED	19.1	172	0.31
42	776		P'SEED	17.5	134	0.16
43	777		P'SEED	19.6	174	0.12

TABLE C-5

****** RAW DATA LIST ******

DRIVE: 1 FILE: 25
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: SUMMERSTOWN DISTRICT: GLENGARRY
LAT/LONG: 4504/7433 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	160		B.BULLHEAD	31.5	503	0.16
2	161		B.BULLHEAD	26.5	261	0.19
3	162		B.BULLHEAD	32.0	548	0.21
4	163		B.BULLHEAD	34.0	552	0.24
5	164		B.BULLHEAD	29.0	330	0.18
6	165		B.BULLHEAD	32.0	516	0.21
7	167		B.BULLHEAD	31.0	497	0.21
8	168		B.BULLHEAD	29.0	395	0.28
9	169		B.BULLHEAD	27.5	333	0.15
10	170		B.BULLHEAD	35.0	692	0.19
11	171		B.BULLHEAD	28.0	320	0.19
12	172		B.BULLHEAD	33.7	576	0.20
13	173		B.BULLHEAD	30.0	386	0.25
14	174		B.BULLHEAD	31.0	416	0.18
15	175		B.BULLHEAD	29.0	369	0.26
16	176		B.BULLHEAD	30.0	414	0.14
17	177		B.BULLHEAD	23.7	185	0.17
18	178		B.BULLHEAD	33.0	493	0.22
19	179		B.BULLHEAD	33.0	553	0.23
20	180		B.BULLHEAD	33.5	597	0.20
21	181		B.BULLHEAD	29.5	368	0.23
22	182		B.BULLHEAD	34.0	597	0.24
23	183		B.BULLHEAD	35.0	559	0.20
24	185		B.BULLHEAD	32.0	539	0.20
25	186		B.BULLHEAD	31.0	414	0.16
26	187		B.BULLHEAD	32.0	545	0.24
27	188		B.BULLHEAD	31.5	446	0.18
28	189		B.BULLHEAD	32.0	506	0.16
29	190		B.BULLHEAD	31.0	454	0.26
30	191		B.BULLHEAD	32.0	543	0.16
31	192		B.BULLHEAD	31.0	457	0.34
32	193		B.BULLHEAD	33.7	727	0.15
33	194		B.BULLHEAD	32.0	481	0.28
34	195		B.BULLHEAD	31.0	521	0.26
35	196		B.BULLHEAD	30.0	444	0.29
36	197		B.BULLHEAD	33.0	637	0.28
37	198		B.BULLHEAD	33.0	457	0.14
38	199		B.BULLHEAD	30.0	416	0.15
39	200		B.BULLHEAD	31.0	430	0.23
40	201		B.BULLHEAD	30.9	363	0.18
41	202		B.BULLHEAD	23.0	164	0.14
42	203		B.BULLHEAD	22.0	128	0.12
43	204		B.BULLHEAD	32.0	452	0.20
44	205		B.BULLHEAD	34.0	558	0.20
45	206		B.BULLHEAD	31.0	419	0.21
46	207		B.BULLHEAD	30.0	396	0.22
47	208		B.BULLHEAD	31.0	435	0.18
48	209		B.BULLHEAD	27.0	314	0.12
49	349		Y. PERCH	24.9	204	0.20
50	350		Y. PERCH	23.8	204	0.23

TABLE C-5 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 26
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: SUMMERSTOWN DISTRICT: GLENGARRY
LAT/LONG: 4504/7433 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	351		Y. PERCH	22.8	174	0.26
2	352		Y. PERCH	21.3	135	0.34
3	353		Y. PERCH	24.2	209	0.33
4	354		Y. PERCH	21.3	142	0.26
5	355		Y. PERCH	22.1	163	0.23
6	356		Y. PERCH	23.6	199	0.52
7	357		Y. PERCH	26.9	253	0.49
8	358		Y. PERCH	19.4	103	0.19
9	359		Y. PERCH	18.9	92	0.27
10	360		Y. PERCH	20.2	110	0.25
11	361		Y. PERCH	23.1	175	0.29
12	362		Y. PERCH	22.1	141	0.26
13	363		Y. PERCH	23.2	174	0.36
14	364		Y. PERCH	21.0	128	0.36
15	365		Y. PERCH	19.5	100	0.29
16	366		Y. PERCH	20.7	117	0.30
17	367		Y. PERCH	18.6	90	0.23
18	368		Y. PERCH	22.6	156	0.29
19	369		Y. PERCH	19.5	104	0.24
20	370		Y. PERCH	18.4	83	0.24
21	371		Y. PERCH	23.1	164	0.35
22	372		Y. PERCH	19.0	103	0.36
23	373		Y. PERCH	21.6	150	0.33
24	374		Y. PERCH	19.5	104	0.26
25	375		Y. PERCH	21.9	137	0.45
26	376		Y. PERCH	20.1	104	0.39
27	377		Y. PERCH	19.8	94	0.24
28	378		Y. PERCH	18.9	81	0.19
29	379		Y. PERCH	19.4	101	0.20
30	380		Y. PERCH	23.6	180	0.23
31	381		Y. PERCH	22.8	171	0.32
32	382		Y. PERCH	19.9	96	0.22
33	383		Y. PERCH	18.5	87	0.23
34	384		Y. PERCH	19.9	97	0.24
35	385		Y. PERCH	19.2	103	0.21
36	386		Y. PERCH	24.0	178	0.38
37	387		Y. PERCH	18.5	90	0.23
38	388		Y. PERCH	21.9	138	0.40
39	389		Y. PERCH	20.0	115	0.25
40	390		Y. PERCH	19.7	97	0.38
41	391		Y. PERCH	21.7	128	0.27
42	392		Y. PERCH	18.0	80	0.23
43	393		Y. PERCH	20.9	125	0.28
44	394		Y. PERCH	20.6	118	0.33
45	395		Y. PERCH	21.7	139	0.35
46	396		PIKE	73.0	2343	1.96
47	397		PIKE	73.6	2468	1.20

TABLE C-6

****** RAW DATA LIST ******

DRIVE: 1 FILE: 21
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: GLEN WALTER DISTRICT: GLENGARRY
LAT/LONG: 4502/7437 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	471		Y. PERCH	21.0	121	0.30
2	472		Y. PERCH	24.6	205	0.43
3	473		Y. PERCH	18.8	83	0.40
4	474		Y. PERCH	19.9	103	0.23
5	475		Y. PERCH	23.5	177	0.51
6	476		Y. PERCH	22.0	145	0.35
7	477		Y. PERCH	19.0	94	0.27
8	478		Y. PERCH	17.2	73	0.23
9	479		Y. PERCH	19.4	96	0.22
10	480		Y. PERCH	21.2	120	0.38
11	481		Y. PERCH	26.4	303	0.36
12	482		Y. PERCH	22.0	140	0.43
13	483		Y. PERCH	18.7	90	0.22
14	484		Y. PERCH	19.3	88	0.27
15	485		Y. PERCH	22.2	150	0.30
16	486		Y. PERCH	21.4	128	0.29
17	487		Y. PERCH	22.1	152	0.33
18	488		Y. PERCH	23.0	166	0.33
19	489		Y. PERCH	19.0	97	0.36
20	490		Y. PERCH	22.3	165	0.35
21	491		Y. PERCH	17.5	69	0.24
22	492		Y. PERCH	21.6	132	0.37
23	493		Y. PERCH	22.2	150	0.33
24	494		Y. PERCH	25.1	218	0.26
25	495		Y. PERCH	24.1	175	0.46
26	496		Y. PERCH	21.3	126	0.28
27	497		Y. PERCH	21.9	122	0.33
28	498		Y. PERCH	18.5	80	0.30
29	499		Y. PERCH	19.3	102	0.24
30	500		Y. PERCH	18.8	85	0.36
31	501		Y. PERCH	18.1	66	0.27
32	502		Y. PERCH	21.7	124	0.25
33	503		Y. PERCH	18.2	76	0.24
34	504		Y. PERCH	21.8	127	0.30
35	505		Y. PERCH	24.3	180	0.23
36	506		Y. PERCH	22.0	160	0.33
37	507		Y. PERCH	17.2	61	0.22
38	508		Y. PERCH	18.7	82	0.18
39	509		Y. PERCH	23.8	191	0.33
40	510		Y. PERCH	20.8	116	0.37
41	511		Y. PERCH	19.8	95	0.31
42	512		Y. PERCH	19.0	66	0.32
43	513		Y. PERCH	18.5	92	0.21
44	514		Y. PERCH	19.0	97	0.36
45	515		Y. PERCH	19.4	90	0.24
46	516		Y. PERCH	22.0	141	0.45
47	517		Y. PERCH	19.0	78	0.52
48	518		Y. PERCH	19.0	77	0.38
49	679		B.BULLHEAD	37.0	695	0.29
50	680		B.BULLHEAD	36.3	724	0.16

TABLE C-6 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 22
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: GLEN WALTER DISTRICT: GLENGARRY
LAT/LONG: 4502/7437 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	681		B.BULLHEAD	31.5	458	0.25
2	682		B.BULLHEAD	31.1	432	0.15
3	683		B.BULLHEAD	34.5	629	0.25
4	684		B.BULLHEAD	28.2	335	0.23
5	685		B.BULLHEAD	31.4	526	0.24
6	686		B.BULLHEAD	29.9	423	0.20
7	687		B.BULLHEAD	30.5	376	0.19
8	688		B.BULLHEAD	25.9	299	0.20
9	689		B.BULLHEAD	27.1	273	0.13
10	690		B.BULLHEAD	25.9	275	0.16
11	691		B.BULLHEAD	27.6	317	0.19
12	692		B.BULLHEAD	27.7	332	0.19
13	693		B.BULLHEAD	24.1	201	0.14
14	694		B.BULLHEAD	28.6	391	0.23
15	695		B.BULLHEAD	31.2	488	0.20
16	696		B.BULLHEAD	28.8	376	0.18
17	697		B.BULLHEAD	27.5	330	0.21
18	698		B.BULLHEAD	26.8	309	0.17
19	699		B.BULLHEAD	32.3	534	0.19
20	700		B.BULLHEAD	31.4	484	0.21
21	701		B.BULLHEAD	23.7	211	0.21
22	702		B.BULLHEAD	29.4	402	0.20
23	703		B.BULLHEAD	21.3	178	0.23
24	704		B.BULLHEAD	20.1	158	0.20
25	705		B.BULLHEAD	35.5	676	0.16
26	706		B.BULLHEAD	24.1	150	0.18
27	707		B.BULLHEAD	31.4	492	0.24
28	708		B.BULLHEAD	29.4	403	0.28
29	709		B.BULLHEAD	27.5	330	0.19
30	710		B.BULLHEAD	23.8	185	0.12
31	711		B.BULLHEAD	34.4	550	0.18
32	712		B.BULLHEAD	31.5	452	0.17
33	713		B.BULLHEAD	25.8	253	0.23
34	714		B.BULLHEAD	32.9	575	0.24
35	715		B.BULLHEAD	25.2	258	0.19
36	716		B.BULLHEAD	33.7	592	0.18
37	717		B.BULLHEAD	23.8	196	0.18
38	718		B.BULLHEAD	25.8	273	0.21
39	719		B.BULLHEAD	33.3	592	0.30
40	720		B.BULLHEAD	26.7	288	0.16
41	721		B.BULLHEAD	33.9	672	0.26
42	722		B.BULLHEAD	28.4	360	0.18
43	723		B.BULLHEAD	27.9	366	0.25
44	724		B.BULLHEAD	20.5	143	0.19
45	725		B.BULLHEAD	19.5	121	0.09
46	726		B.BULLHEAD	31.5	514	0.24
47	727		B.BULLHEAD	25.5	279	0.21
48	728		B.BULLHEAD	25.6	280	0.23
49	1		PIKE	64.5	1631	0.91
50	2		PIKE	56.7	1098	0.40

TABLE C-6 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 24
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: GLEN WALTER DISTRICT: GLENGARRY
LAT/LONG: 4502/7437 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	346		P'SEED	15.0	87	0.21
2	347		P'SEED	15.6	97	0.15
3	348		P'SEED	14.5	86	0.26

TABLE C-6 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 23
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: GLEN WALTER DISTRICT: GLENGARRY
LAT/LONG: 4502/7437 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	3		PIKE	69.0	2168	0.89
2	12		P'SEED	20.2	240	0.37
3	13		P'SEED	17.8	147	0.26
4	14		P'SEED	15.9	115	0.18
5	15		P'SEED	17.2	143	0.22
6	16		P'SEED	18.8	195	0.22
7	17		P'SEED	20.2	298	0.42
8	18		P'SEED	19.8	199	0.39
9	19		P'SEED	19.2	224	0.36
10	20		P'SEED	18.0	163	0.26
11	21		P'SEED	20.0	168	0.37
12	22		P'SEED	16.1	116	0.21
13	23		B. CRAPPIE	21.5	158	0.16
14	24		P'SEED	20.0	209	0.35
15	25		P'SEED	19.4	184	0.32
16	26		P'SEED	17.6	149	0.17
17	27		P'SEED	20.1	207	0.39
18	28		P'SEED	17.8	156	0.22
19	29		P'SEED	18.8	205	0.24
20	30		P'SEED	16.6	137	0.22
21	31		P'SEED	14.0	66	0.23
22	32		P'SEED	18.0	176	0.30
23	33		P'SEED	21.3	277	0.30
24	34		P'SEED	18.3	167	0.24
25	35		P'SEED	19.0	192	0.27
26	36		P'SEED	13.6	66	0.21
27	37		P'SEED	19.7	189	0.49
28	38		P'SEED	15.7	104	0.19
29	39		P'SEED	19.0	228	0.36
30	40		P'SEED	20.4	269	0.42
31	41		P'SEED	12.7	53	0.25
32	42		P'SEED	15.3	97	0.23
33	43		P'SEED	18.1	176	0.50
34	44		P'SEED	19.8	241	0.43
35	45		P'SEED	17.3	150	0.20
36	46		P'SEED	20.0	208	0.43
37	47		P'SEED	18.8	188	0.36
38	48		P'SEED	16.1	121	0.22
39	49		P'SEED	13.6	65	0.18
40	50		P'SEED	15.0	88	0.20
41	51		P'SEED	16.5	117	0.37
42	52		B. CRAPPIE	26.0	296	0.31
43	338		P'SEED	14.6	86	0.25
44	339		P'SEED	15.6	99	0.22
45	340		P'SEED	13.3	59	0.19
46	341		P'SEED	15.5	102	0.18
47	342		P'SEED	15.1	91	0.19
48	343		P'SEED	15.9	112	0.18
49	344		P'SEED	13.6	65	0.22
50	345		P'SEED	16.6	122	0.20

TABLE C-7

****** RAW DATA LIST ******

DRIVE: 1 FILE: 36
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: IROQUOIS DISTRICT: DUNDAS
LAT/LONG: 4451/7519 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	113		W. SUCKER	42.8	786	0.44
2	114		W. SUCKER	43.0	806	0.44
3	115		W. SUCKER	45.0	778	0.61
4	116		W. SUCKER	46.3	981	0.51
5	117		W. SUCKER	46.0	1066	0.51
6	118		W. SUCKER	15.6	1110	0.68
7	119		W. SUCKER	44.0	893	0.48
8	120		W. SUCKER	60.0	2258	0.42
9	121		W. SUCKER	41.4	779	0.38
10	122		W. SUCKER	44.0	962	0.43
11	123		W. SUCKER	43.0	900	0.36
12	124		W. SUCKER	40.7	718	0.48
13	134		P'SEED	17.1	124	0.22
14	135		P'SEED	17.5	126	0.23
15	136		P'SEED	13.0	65	0.20
16	137		P'SEED	16.3	111	0.15
17	138		P'SEED	14.8	78	0.14
18	139		P'SEED	15.3	89	0.18
19	140		P'SEED	15.8	83	0.21
20	141		P'SEED	15.2	82	0.22
21	142		P'SEED	16.4	100	0.25
22	143		P'SEED	18.4	170	0.41
23	144		P'SEED	16.3	97	0.26
24	145		P'SEED	18.0	164	0.37
25	146		P'SEED	17.0	117	0.27
26	147		P'SEED	17.0	120	0.22
27	148		P'SEED	15.2	76	0.19
28	149		P'SEED	12.8	54	0.12
29	150		P'SEED	16.0	113	0.11
30	151		P'SEED	16.3	116	0.18
31	152		P'SEED	15.6	80	0.12
32	153		P'SEED	16.7	125	0.19
33	154		P'SEED	15.8	92	0.30
34	155		P'SEED	16.0	93	0.13
35	156		P'SEED	15.1	80	0.19
36	157		P'SEED	16.4	123	0.28
37	158		P'SEED	14.5	78	0.18
38	159		P'SEED	18.2	134	0.35
39	215		P'SEED	15.0	79	0.30
40	216		P'SEED	17.0	120	0.18
41	217		P'SEED	16.0	88	0.16
42	218		P'SEED	15.0	82	0.20
43	219		P'SEED	16.0	103	0.23
44	220		P'SEED	15.0	80	0.16
45	221		P'SEED	15.2	65	0.14
46	222		P'SEED	18.0	119	0.63
47	273		PIKE	58.5	1506	0.28
48	274		PIKE	59.4	1803	0.39
49	275		PIKE	60.3	1494	0.34
50	276		PIKE	56.9	1288	0.37

TABLE C-7 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 37
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: IROQUOIS DISTRICT: DUNDAS
LAT/LONG: 4451/7519 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	277		PIKE	61.0	1558	0.31
2	278		PIKE	70.0	2416	0.67
3	279		PIKE	54.0	740	1.02
4	280		PIKE	53.0	890	0.82
5	281		PIKE	65.0	1878	0.65
6	282		PIKE	74.0	2840	0.90
7	283		PIKE	54.0	925	0.76
8	284		PIKE	40.0	360	0.17
9	285		PIKE	37.0	295	0.24
10	286		PIKE	87.0	4124	2.00
11	297		R. BASS	20.0	160	0.42
12	298		R. BASS	19.0	154	0.48
13	299		R. BASS	16.7	100	0.38
14	300		R. BASS	17.5	123	0.27
15	301		R. BASS	18.6	126	0.22
16	302		R. BASS	19.5	162	0.26
17	303		R. BASS	15.5	68	0.38
18	304		R. BASS	18.5	133	0.37
19	305		R. BASS	16.5	100	0.22
20	312		S.M. BASS	36.8	738	1.07
21	313		Y. PERCH	20.5	106	0.20
22	314		Y. PERCH	23.1	149	0.49
23	315		Y. PERCH	21.3	119	0.24
24	316		Y. PERCH	21.0	112	0.27
25	317		Y. PERCH	20.4	98	0.34
26	318		Y. PERCH	22.0	149	0.24
27	319		Y. PERCH	21.0	107	0.36
28	320		Y. PERCH	20.8	107	0.39
29	321		Y. PERCH	18.5	70	0.19
30	322		Y. PERCH	23.4	136	0.54
31	323		Y. PERCH	21.1	126	0.25
32	324		Y. PERCH	20.5	82	0.27
33	325		Y. PERCH	22.0	129	0.49
34	326		Y. PERCH	21.3	118	0.71
35	327		Y. PERCH	17.6	62	0.28
36	328		W. PERCH	20.9	132	0.19
37	329		W. PERCH	18.5	97	0.39
38	330		W. PERCH	21.3	140	0.35
39	331		W. PERCH	17.6	70	0.29
40	332		W. PERCH	22.5	170	0.16
41	333		W. PERCH	19.0	100	0.13
42	334		W. PERCH	17.7	87	0.20
43	335		W. PERCH	20.7	147	0.32
44	336		W. PERCH	19.9	115	0.30
45	337		W. PERCH	18.8	104	0.12
46	519		B. CRAPPIE	20.7	126	0.17
47	520		B. CRAPPIE	21.2	152	0.16
48	521		B. CRAPPIE	25.5	289	0.25
49	522		B. CRAPPIE	19.9	113	0.17
50	523		B. CRAPPIE	21.5	146	0.18

TABLE C-7 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 38
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: IROQUOIS DISTRICT: DUNDAS
LAT/LONG: 4451/7519 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	524		B. CRAPPIE	23.1	171	0.18
2	525		B. CRAPPIE	19.5	122	0.16
3	526		B. CRAPPIE	21.7	154	0.18
4	527		B. CRAPPIE	22.9	182	0.29
5	528		B. CRAPPIE	22.5	179	0.19
6	529		B. CRAPPIE	22.5	187	0.23
7	530		B. CRAPPIE	21.8	142	0.17
8	531		B. CRAPPIE	19.8	124	0.07
9	532		B. CRAPPIE	22.1	163	0.20
10	533		B. CRAPPIE	19.3	125	0.06
11	534		B. CRAPPIE	22.7	173	0.24
12	535		B. CRAPPIE	23.4	204	0.27
13	536		B. CRAPPIE	26.0	256	0.31
14	537		B. CRAPPIE	20.3	129	0.14
15	538		B. CRAPPIE	21.5	160	0.18
16	539		B. CRAPPIE	24.7	206	0.45
17	540		B. CRAPPIE	21.2	141	0.24
18	541		B. CRAPPIE	24.0	226	0.21
19	542		B. CRAPPIE	24.5	260	0.14
20	543		B. CRAPPIE	19.5	118	0.18
21	544		B. CRAPPIE	21.0	116	0.21
22	545		B. CRAPPIE	21.2	145	0.15
23	546		B. CRAPPIE	19.2	113	0.17
24	547		B. CRAPPIE	21.1	133	0.21
25	548		B. CRAPPIE	22.6	158	0.13
26	549		B. CRAPPIE	22.8	191	0.17
27	550		B. CRAPPIE	21.4	138	0.12
28	551		B. CRAPPIE	22.5	179	0.19
29	552		B. CRAPPIE	22.0	166	0.20
30	553		B. CRAPPIE	22.1	147	0.22
31	554		B. CRAPPIE	26.6	342	0.32
32	555		B. CRAPPIE	21.1	129	0.21
33	556		B. CRAPPIE	22.6	159	0.22
34	557		B. CRAPPIE	21.2	141	0.10
35	558		B. CRAPPIE	20.9	145	0.17
36	559		B. CRAPPIE	24.4	221	0.27
37	560		B. CRAPPIE	18.8	96	0.10
38	561		B. CRAPPIE	20.6	135	0.20
39	562		B. CRAPPIE	20.5	139	0.17
40	563		B. CRAPPIE	22.4	164	0.20
41	564		B. CRAPPIE	24.0	212	0.23
42	565		B. CRAPPIE	20.5	125	0.21
43	566		B. CRAPPIE	21.3	142	0.08
44	567		B. CRAPPIE	24.6	256	0.28
45	568		Y. PERCH	22.8	193	0.24
46	569		Y. PERCH	19.0	76	0.31
47	570		Y. PERCH	22.4	155	0.49
48	571		Y. PERCH	22.8	156	0.52
49	572		Y. PERCH	19.1	75	0.33
50	573		Y. PERCH	20.5	111	0.45

TABLE C-7 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 39
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: IROQUOIS DISTRICT: DUNDAS
LAT/LONG: 4451/7519 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	574		Y. PERCH	20.3	102	0.41
2	575		Y. PERCH	24.1	148	0.66
3	576		Y. PERCH	21.6	126	0.38
4	577		Y. PERCH	17.7	60	0.27
5	578		Y. PERCH	24.8	192	0.45
6	579		Y. PERCH	29.5	315	1.11
7	778		W. SUCKER	45.8	976	0.58
8	779		W. SUCKER	39.4	689	0.36
9	780		W. SUCKER	41.1	786	0.37
10	781		W. SUCKER	46.6	865	0.66
11	782		W. SUCKER	40.1	725	0.16
12	783		W. SUCKER	47.0	1285	0.38
13	784		W. SUCKER	37.8	700	0.22
14	785		W. SUCKER	41.0	640	0.34
15	786		W. SUCKER	43.0	873	0.62
16	787		W. SUCKER	42.8	640	0.64
17	788		W. SUCKER	43.4	1007	0.31
18	789		W. SUCKER	43.0	654	0.35
19	790		W. SUCKER	40.9	910	0.22
20	791		W. SUCKER	42.9	902	0.32
21	792		W. SUCKER	40.0	776	0.37
22	793		W. SUCKER	44.9	795	0.60
23	794		W. SUCKER	37.8	601	0.44
24	851		B.BULLHEAD	23.2	150	0.23
25	852		B.BULLHEAD	23.3	147	0.25
26	853		B.BULLHEAD	26.0	216	0.35
27	854		B.BULLHEAD	21.1	115	0.25
28	855		B.BULLHEAD	25.2	174	0.14
29	856		B.BULLHEAD	21.6	122	0.17
30	857		B.BULLHEAD	23.0	140	0.26
31	858		B.BULLHEAD	25.9	215	0.17
32	859		B.BULLHEAD	24.2	167	0.24
33	860		B.BULLHEAD	20.3	97	0.25
34	861		B.BULLHEAD	21.1	107	0.23
35	862		B.BULLHEAD	23.1	161	0.16
36	863		B.BULLHEAD	23.0	149	0.18
37	864		B.BULLHEAD	27.0	250	0.26
38	865		B.BULLHEAD	24.5	170	0.15
39	866		B.BULLHEAD	24.0	156	0.31
40	867		B.BULLHEAD	24.5	169	0.26
41	868		B.BULLHEAD	23.4	123	0.28
42	869		B.BULLHEAD	24.6	181	0.14
43	870		B.BULLHEAD	25.6	197	0.26
44	871		B.BULLHEAD	23.8	171	0.11
45	872		B.BULLHEAD	23.0	136	0.19
46	873		B.BULLHEAD	23.0	148	0.14
47	874		B.BULLHEAD	22.8	125	0.15
48	875		B.BULLHEAD	22.7	133	0.16
49	876		L.M. BASS	33.6	723	0.60
50	877		S.M. BASS	39.0	1003	0.97

TABLE C-7 cont'd

****** RAW DATA LIST ******

DRIVE: 1 FILE: 40
LOCATION: ONTARIO #5 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: IROQUOIS DISTRICT: DUNDAS
LAT/LONG: 4451/7519 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	878		S.M. BASS	36.2	772	0.79
2	879		R. BASS	17.0	79	0.35
3	880		R. BASS	17.1	91	0.44
4	881		R. BASS	18.7	98	0.70
5	882		PIKE	76.0	2982	1.16
6	883		PIKE	71.9	2517	0.77
7	884		PIKE	57.3	1235	0.44
8	885		PIKE	56.8	1344	0.31
9	886		PIKE	57.0	1178	0.27
10	887		PIKE	73.8	2857	0.69
11	888		PIKE	65.9	1982	0.38
12	889		PIKE	71.5	2631	0.58
13	890		PIKE	47.4	791	0.24
14	891		PIKE	48.0	354	1.00
16	398		W. PERCH	24.0	236	0.39
17	399		W. PERCH	18.0	89	0.15
18	400		W. PERCH	21.0	150	0.23
19	401		W. PERCH	17.8	74	0.16
20	402		W. PERCH	20.2	128	0.27
21	403		W. PERCH	21.6	162	0.14
22	404		W. PERCH	17.0	68	0.23
23	405		W. PERCH	20.7	144	0.23
24	406		W. PERCH	20.0	105	0.32
25	407		W. PERCH	20.5	138	0.17
26	408		W. PERCH	20.5	132	0.11
27	409		W. PERCH	17.8	75	0.16

TABLE C-8

****** RAW DATA LIST ******

DRIVE: 1 FILE: 41
LOCATION: ONTARIO #7 OUTPUT OPTION: 1
YEAR: 1975
TOWNSHIP: L. ST. FRANCIS DISTRICT: GLENGARRY
LAT/LONG: 4508/7430 REGION: SE

ROW#	SAMPLE#	SUBLOC	SPECIES	LENGTH	WEIGHT	HG
1	297		W. SUCKER	43.5	1138	0.23
2	298		W. SUCKER	44.0	1033	0.48
3	299		W. SUCKER	44.5	1241	0.31
4	300		W. SUCKER	46.0	1317	0.72
5	301		W. SUCKER	46.0	1589	0.64
6	302		W. SUCKER	46.5	1232	0.78
7	303		W. SUCKER	46.5	1386	0.35
8	304		W. SUCKER	47.0	1328	0.46
9	305		W. SUCKER	48.5	1709	0.57
10	306		W. SUCKER	50.0	1789	0.79
11	307		W. SUCKER	50.5	1394	0.51
12	308		W. SUCKER	51.5	1829	0.41
13	309		W. SUCKER	54.0	1966	0.20
14	310		W. SUCKER	55.5	2349	0.62
15	311		W. SUCKER	57.0	2862	0.60
16	312		PIKE	75.0	2861	1.27
17	313		WALLEYE	44.0	803	0.60
18	314		WALLEYE	44.0	949	0.72
19	315		WALLEYE	45.5	964	0.64
20	316		WALLEYE	45.5	1038	0.80
21	317		WALLEYE	46.0	1084	0.69
22	318		WALLEYE	48.5	1434	0.86
23	319		WALLEYE	51.0	1337	1.00
24	320		WALLEYE	52.5	1688	1.00
25	321		WALLEYE	53.5	1696	1.00
26	322		WALLEYE	54.0	1774	1.20
27	323		WALLEYE	55.0	1822	1.51
28	324		WALLEYE	57.0	1861	1.77
29	325		WALLEYE	57.0	1948	1.07
30	326		WALLEYE	57.5	2446	0.86
31	327		WALLEYE	59.0	1762	2.24
32	328		WALLEYE	59.5	2629	1.56
33	329		WALLEYE	62.0	2655	1.51
34	330		WALLEYE	72.5	3989	2.61
35	331		WALLEYE	75.0	4072	3.40

TERMINAL STREAM: WIGLE CR.

DATE	ISSUED TO